AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

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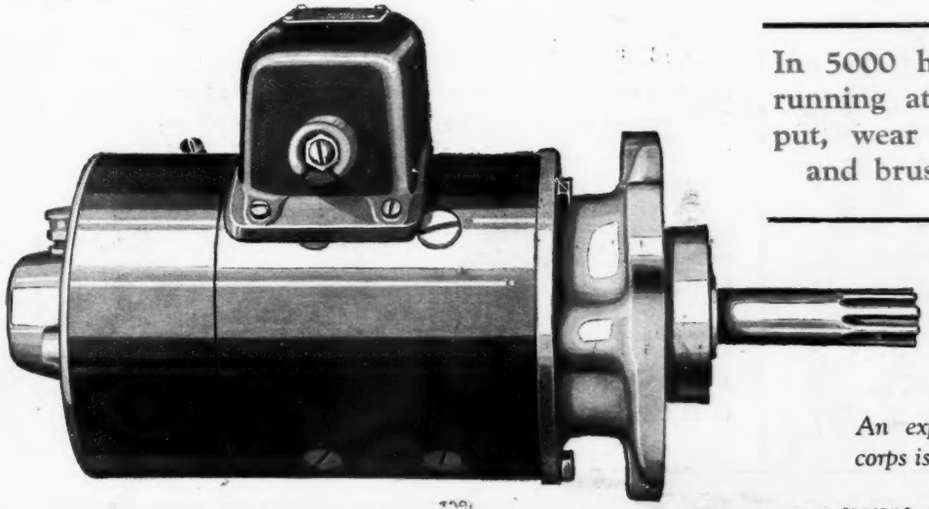

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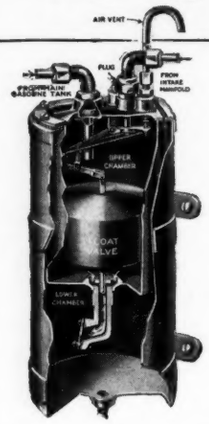

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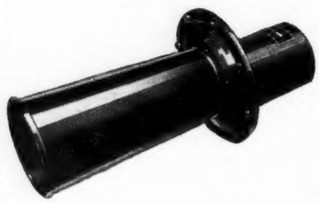

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AUTOMOTIVE INDUSTRIES
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VOL. XLIII NEW YORK—THURSDAY, DECEMBER 2, 1920 No. 23

Germany Grimly Hopeful for Her Aircraft Industry

With the factories shut down, the manufactured parts in scrap heaps and practically all existing planes surrendered, the Teutons are looking forward to the day when they will lead in commercial plane construction and in conduct of trade routes.

By W. F. Bradley

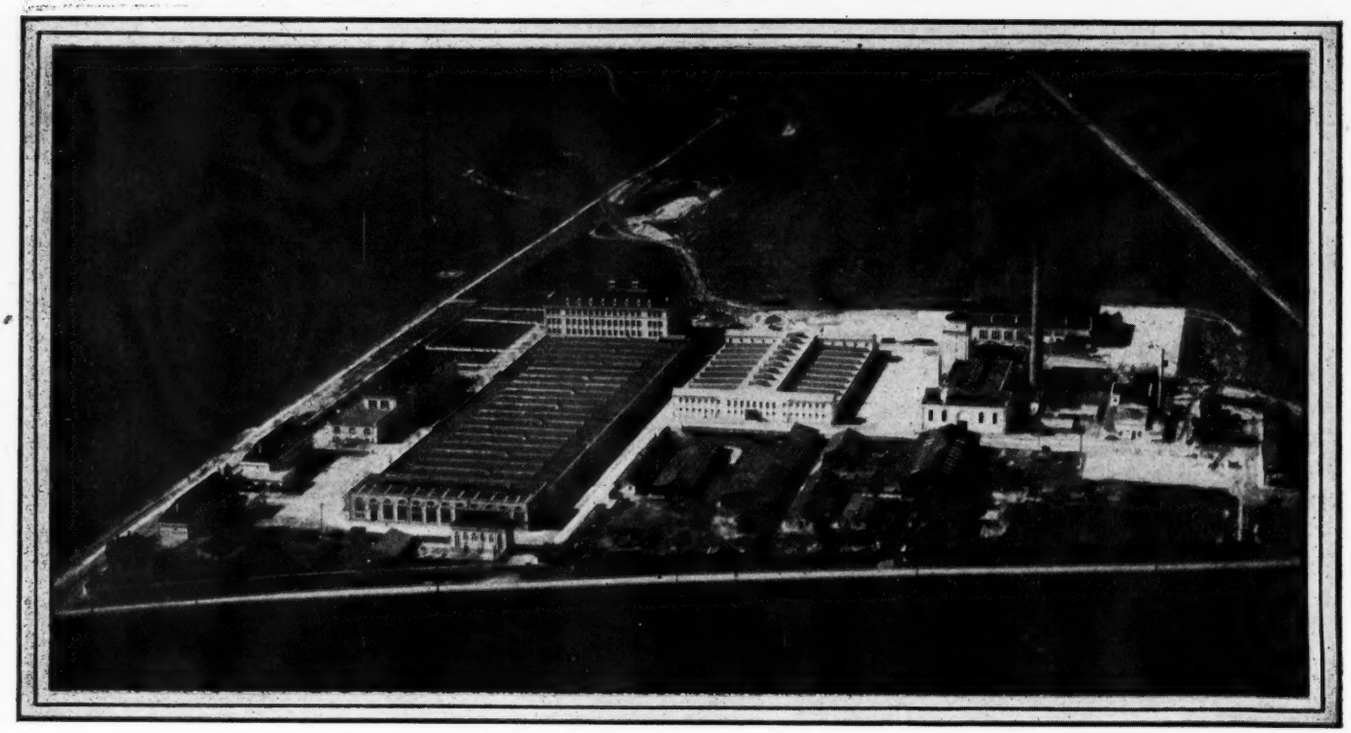
UNDER the terms of the Peace Treaty, Germany was ordered to cease airplane construction and to deliver the whole of her existing military aviation material to the Allies. In order to enforce this article of the treaty, an Allied mission having at its head Gen. Mastermann of the British Army, and Col. Dorand of the French Army, was sent into Germany with a staff of military and civilian experts from the French and British Flying Corps and from the aviation and automobile factories of the two countries. This mission has practically completed its work, and at the present time only a few members remain behind to round up any material which may have been overlooked and to supervise the destruction of ground organizations.

It is recognized, even by the Germans, that a very judicious choice was made in Gen. Mastermann and Col. Dorand. The latter, during the war, was head of the technical section of the Air Service of the French Army and is the designer of airplanes of very high merit.

The task which fell to this commission was not at all easy. Although the treaty of peace was signed on Nov. 11, 1918, its terms were not applied until Jan. 10, 1920. It was stipulated on this date that Germany would not be allowed to recommence airplane construction for six months, or until July 10, 1920. When this period expired, it was found that none of the conditions of the treaty had been fulfilled, and Germany was informed that she would not be allowed to recommence construction until three months after the complete execution of her obligations.

The arrangement gave considerable power to the Mission, for they alone had to determine what was military and what commercial material, and they alone could decide when all material had really been delivered or destroyed. But the interval of 15 months between the signing of the peace treaty and its application made the task of the Mission considerably more difficult, for Germany had had time to destroy or export much of the material required to be delivered, hordes of intermediaries endeavored to make money out of the situation and the revolution added still further to the disorder.

There is no doubt that the terms of the Peace Treaty calling for the delivery or destruction of all German military aviation material was much resented in that country. The difficulties which the Allies have experienced in order to get delivery of that material must not all be attributed to the action of the Government or to persons in authority.



Airplane view of Bayerische Motoren Werke near Munich

Intermediaries found various ways of getting possession of this material and they sought to sell it abroad with no other idea than a profit for themselves. There was a wild idea that aviation engines were of immense value and it not infrequently happened, in the 15 months preceding the application of the treaty, that quantities of engines would be bought at 1000 marks each and, after changing hands several times until they had reached 20,000 marks each, would be called in by Government order, paid for at a merely nominal sum, in order to be handed over to the Allies and thrown on the scrap heap.

Frequently members of the Allied Mission got track of hidden material by contact with intermediaries who were trying to negotiate sales. On the other hand, patriotic groups were unearthed from time to time with German aviation material in their possession which should have been declared and given up. Only a few days ago three million marks' worth of aviation engines were discovered hidden in a mill in Bavaria.

The policy of the Mission appears to have been that all aviation engines were military material and should be delivered. Planes are rather more delicate, for the line of demarcation is not at all clearly defined between a military and a commercial plane. In this matter the technical head of the Mission was sole judge, and his line of conduct was to ascertain whether any plane possessed qualities which allowed it to be used in war with equal advantage to Allied war planes of that particular class.

At the armistice Germany possessed 18,000 planes, of which about 5,000 were in regular service on the front, and 30,000 engines. During the war Germany built hardly more than 40,000 engines, but her policy was to entirely rebuild engines after a certain length of time in service. This is in contrast with the French system, under which practically no airplane engines were rebuilt. During the last year of the war the French factories produced 40,000 engines and repaired none. England again was repairing 1000 engines per month, 500 being handled in France and 500 at home.

At the end of October, 1920, it was considered that Germany did not possess a single airplane or engine capable of being used for military service. It was quite possible, and this was admitted by the members of the Mission, that some planes and some engines might have escaped the vigilant search, but even on the broadest estimate this number could not attain 200.

While Germany possesses no flying material, her aviation factories and her army depots are well stocked with scrap. Thousands of engines have been smashed by the very expeditive method of sending a hammer head through the base chambers and through the cylinder walls. Planes have been stripped, the wing parts sawed through and the fuselage members broken, while huge stacks of propellers have been rendered unfit for further service by having their tips chopped off. Tons of unmachined forgings were lying on the heap for final disposal.

The German contention that these engines might have been used for commercial purposes was never seriously considered by the Allies. At the same time, much of the material used in the planes might have been salvaged instead of being thrown on the scrap heap. Hundreds of copper tanks were noticed in one depot which might have been cut along the seams in order to obtain sheets of metal. Instead they had been punched all over with a hammer. Wing spars and fuselage members also, have been sawed in several places, making them unfit for anything but the wood pile, whereas the lumber might have been saved for other purposes.

Numerous reports have been circulated to the effect that Germany still holds a strong aeronautical position. Even a little thought on the matter would show that this is incorrect, for with the armistice, Germany possessed practically nothing but military material and the Allies were authorized to take delivery of and destroy the whole of this. They have fulfilled their mission, and, at the same time, have prevented Germany building any planes without special permission, with the result that everything of a perishable nature has been destroyed and Germany finds herself with nothing more than a wealth of technical knowledge, which she intends to put to practical use at the earliest possible moment.

Manufacturers have not been the greatest obstacle against the fulfilment of the conditions of the treaty. They realized that the Allies would enforce the terms, despite any opposition, and as they could not recommence manufacture until three months after those conditions had been fulfilled, it was in their interests to get the punishment over as quickly as possible.

A description of the German aviation factories would be devoid of interest, for there are no aviation activities to describe.

At the Rumpler factory, near Augsburg, it was found that a staff of about 300 men was engaged in the repair of railroad trucks and in the manufacture of agricultural machinery. During the war the Augsburg factory employed about 1000 men and produced 400 machines, this being in addition to the planes produced at the original factory near Berlin. With the armistice all aviation work was arrested and for some time the factory was kept running, with a reduced staff, on the production of household furniture. A slump having set in, the furniture department was closed down and in September the works were being converted for the manufacture of agricultural machinery. Despite the rate of exchange, it was declared that American competition was severely felt in this branch of industry.

At the end of September the Rumpler Co. had in its possession 13 airplanes, which they had been allowed to retain by the Allied Mission. One of these was almost ready for flight, but the 12 others needed entire rebuilding. It was the intention of the company to put these machines into shape and to commence civilian services with them as early as possible.

Although it had very few machines capable of being put into flying condition, Rumpler possessed a wealth of junk. Chasse fuselages with their canvas torn off and main members sawed through; wings with the main spars sawed across, broken propellers, large numbers of smashed engines and immense quantities of tanks, fittings, etc., made fit for the junk heap by the use of saw and hammer.

It was stated that as soon as permission was given the Rumpler works would again be used for the construction of airplanes. Commercial services were going to be developed, and the directors were confident that when given liberty of action, Germany would gain a prominent position in world aviation.

As in other countries, German aviation engines were generally built in the automobile factories, Benz and Mercedes being the most important producers. The biggest factory erected specially for the production of aviation engines is the Bayerische Moteren Werke near Munich, where a very successful six-cylinder aviation engine generally known as the BMW was built.

At the beginning of the war this firm had a small factory employing 16 men. At the armistice they were employing 2400 men and producing 150 motors a month, with prospects of an early increase to 250 a month. Erected on a vast plain outside Munich, the BMW are a very fine example of modern factory layout and equipment. With the exception of the offices, all buildings were one story, for almost unlimited space was available. The buildings are light, airy and intelligently planned in relation one to the other. The machinery was all put in during the war and is thoroughly modern. A big Fokker airplane factory exists about half a mile away, and it is to this that many of the BMW engines were delivered, while the whole of the surrounding ground is ideal for airplane testing purposes.

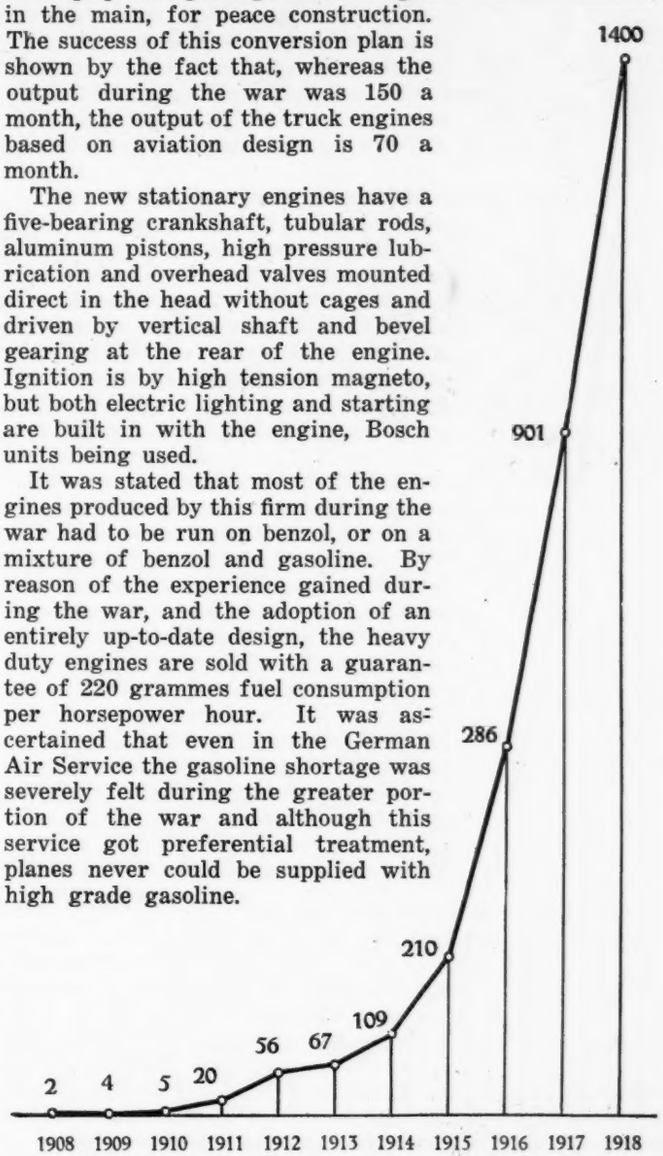
The peace terms made it impossible for BMW to continue manufacturing aviation engines, but the big factory has been very cleverly converted to other work and is employing 1400 men in the production of 1000 railroad brakes a month and 60 to 70 engines for truck, stationary and boat use.

In addition, the shops are preparing to get into production on a very fine type of twin cylinder engine for motorcycles or cyclecars. This engine has two horizontal cylinders with L-head and enclosed valves, mounted on an aluminum base chamber which forms oil reservoir. A ball bearing crankshaft is used, connecting rods are tubular, aluminum pistons are employed and the engine, which is an unusually smart production in its class, runs up to 3,400 under load.

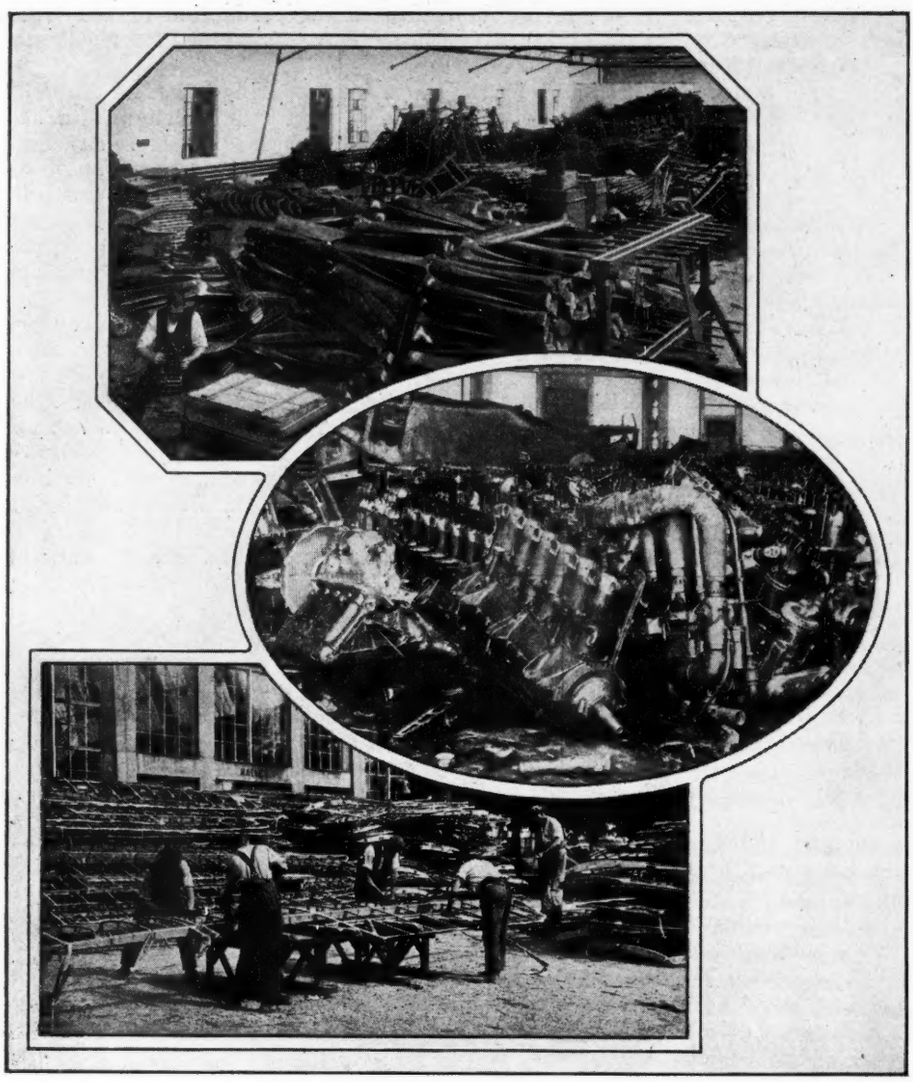
A factory erected exclusively for aviation engine work and having no commercial connection with other branches of industry, undoubtedly found itself in a worse position, at the armistice, than older established firms with broader connections. This, however, does not appear to have seriously interfered with the prosperity of the BMW. The aviation type engine has been modified for truck, boat and stationary work. Instead of being produced with six steel cylinders, it is built with four cast-iron cylinders but the design is the same and the tool equipment got together during the war is available, in the main, for peace construction. The success of this conversion plan is shown by the fact that, whereas the output during the war was 150 a month, the output of the truck engines based on aviation design is 70 a month.

The new stationary engines have a five-bearing crankshaft, tubular rods, aluminum pistons, high pressure lubrication and overhead valves mounted direct in the head without cages and driven by vertical shaft and bevel gearing at the rear of the engine. Ignition is by high tension magneto, but both electric lighting and starting are built in with the engine, Bosch units being used.

It was stated that most of the engines produced by this firm during the war had to be run on benzol, or on a mixture of benzol and gasoline. By reason of the experience gained during the war, and the adoption of an entirely up-to-date design, the heavy duty engines are sold with a guarantee of 220 grammes fuel consumption per horsepower hour. It was ascertained that even in the German Air Service the gasoline shortage was severely felt during the greater portion of the war and although this service got preferential treatment, planes never could be supplied with high grade gasoline.



Rumpler airplane production from 1908 to 1918. The company has two factories, one at Johannisthal, near Berlin, and the other at Augsburg, in Bavaria



Top—German airplane propellers sawed up by order of Allies. Oval—Airplane engines destroyed under the Peace Treaty. A Hispano-Suiza is seen in the foreground—probably a captured engine. Bottom—Clipping Germany's wings—scene in a German airplane factory

The BMW stated that its supply of coal was very unsatisfactory, no deliveries being made from Silesia and the Saar districts. Since the armistice every known kind of fuel had been employed for the furnaces.

The company has its own aluminum foundry and makes a large number of castings for outside use, as well as meeting all its own requirements. It has no iron foundry. Its stores of raw material were considerable.

Last March a Soviet was declared in Munich and for four weeks the entire BMW factory was held by the revolutionary party, backed by 300 rifles and machine guns. After four successive weeks without pay, the movement collapsed and the men returned to work under the old conditions. It was admitted that discontent prevailed, and that the movement was of a political nature, but as an indication that the "Reds" have not a very strong hold on the workers, a two-hour strike was ordered as a protest against the arrest, in Munich, of the Socialist Deputy, Dr. Eisenberger, for the day on which I visited the factory, but not a man left his work. The working hours in this factory are 46 per week, the working day being divided into two sections by a break of half an hour for a light midday meal. Wages vary from 4 to 6 marks an hour, which is lower than in other parts of Germany. It should be mentioned, however, that the cost of living is rather cheaper in Bavaria than elsewhere, and food supplies are more plentiful.

As soon as allowed by the Allied Commission, the BMW will renew airplane engine construction. At the present time this is stopped and large numbers of forgings and cylinders which were in hand when the armistice came into effect are lying on the scrap heap. The claim is made that the BMW holds the world's height record of 9760 meters (32,020.4 feet), established on June 17, 1919, with a D.W.F. biplane piloted by Lieut. Diemer. This record is official in Germany, but has no international standing.

The entire fleet of German military airships had to be delivered to the Allies. Most of these have been handed over and the rest will be given up soon. Five have been destroyed by Germany and, as compensation, the Allies have claimed delivery of the Bodensee and the Nordstern. All military airship drawings have to be given up. Germany has not by any means lost her faith in the Zeppelin and plans are being laid to build bigger ships than were used during the war. Only recently it was discovered that work had begun at Friedrichshaffen on airships of 108,000 cubic meters. Under the powers conferred by the peace treaty this work was stopped. The Zeppelin company is also interested in commercial airplanes.

Many exaggerated stories have been circulated regarding Germany's aeronautical situation. At the present time she possesses neither heavier nor lighter than air machines, and certainly she is not in a position to build trans-Atlantic airships for next year, as has been claimed by certain writers.

Even with assistance from America, no ships of the required capacity could be built within this time limit, for although American interests may have the necessary financial strength, there is an entire absence in the United States of the skilled labor required for this work, and there are no buildings in existence for the construction of these machines, nor for housing them after being built. A Berlin-New York airship service for June, 1921, is nothing more than a wild dream.

Germany has a large number of airplane services and a large number of air navigation companies on paper. Numbers of these possess a central office, a staff of officials, a single plane and a pilot. They are merely figureheads behind which it is intended to build an aerial navigation company as soon as circumstances admit.

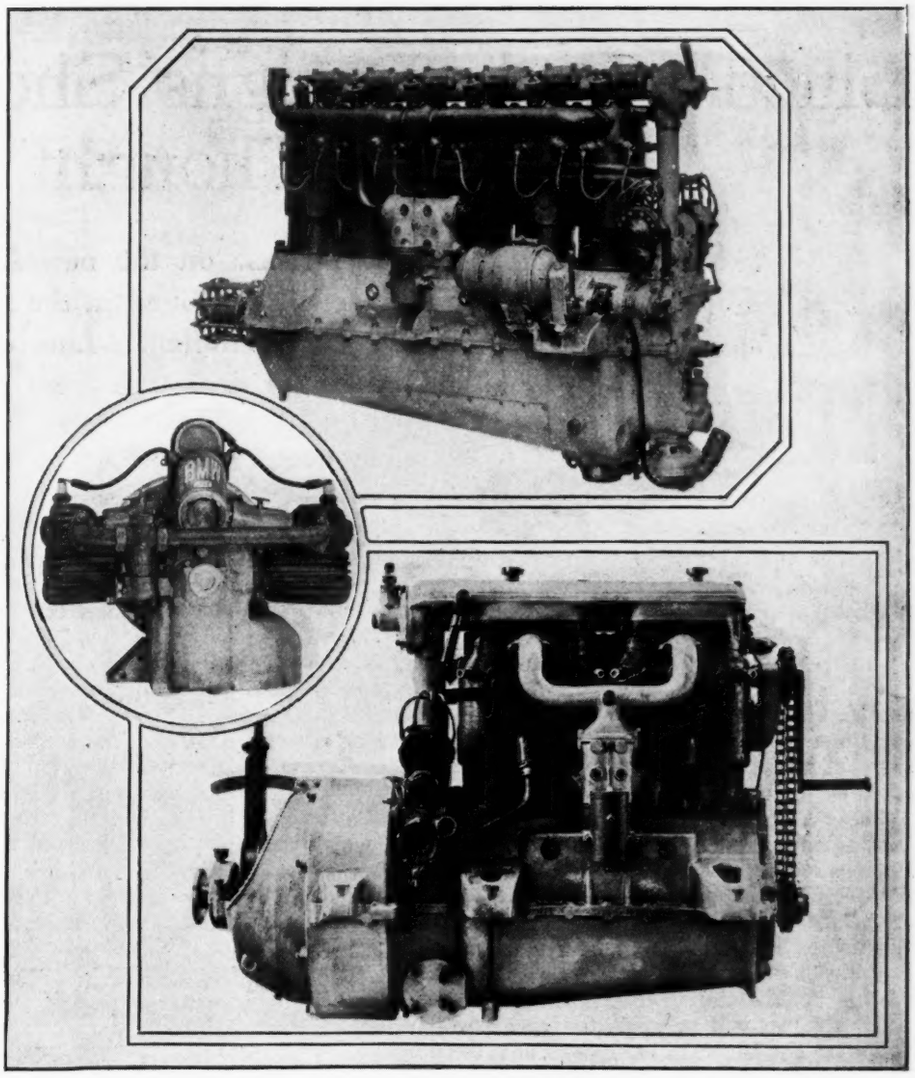
During the Leipzig fair there was a regular service between that city and Berlin, but none exists at the present time. A Berlin-Munich line is supposed to be in existence, but although Rumpler has a factory in each of these two towns, it was impossible, last September, to find a plane in condition to make the trip from Berlin to the Bavarian capital.

Internationally Germany is most interested in airplane services with the Scandinavian countries and has recently established a daily service with Copenhagen. A five-countries line from Berlin to Sweden, Norway, Denmark, with extension to London, has also been formed and an effort is being made to run it daily. Germany's only outlet for the present lies in this direction. There is little intercourse with France and Belgium and no encouragement to run a direct service with London. Traffic with Russia is not possible, and the prospects are not very brilliant at the present time for air services with Italy and Austria.

Germany appears to be much more concerned at the present time about the fate of her airship centers than the condition of her industry. There are five in existence and all have to be delivered to the Allies. The cost of pulling down, transporting and rebuilding each of these airship centers may be estimated at $500,000, but this is only about one-sixth of the actual value of the plants.

As both France and England are interested in the development of Eastern lines, which must cross German territory, the German argument is that all ground organizations should be allowed to remain.

Undoubtedly there is some truth in this, but the Allies are so afraid of Germany gaining a lead in aerial navigation that undoubtedly they will insist on the total destruction of German ground organizations, even if it is necessary for them at a very early date to rebuild some of these organizations for their own lines across Germany to the East.



Top—BMW airplane engine—one of the most successful German types. Circle—Twin cylinder motorcycle or cyclecar engine produced by BMW since the armistice. Bottom—BMW heavy duty engine based on airplane engine design. It is sold with a guaranteed fuel consumption of 220 grams per horsepower-hour

New Italian Import Duties

ITALIAN newspapers repeatedly have protested against the tariff duty levied on Italian automobiles in France, Great Britain and the United States. The *Gazetta Ufficiale* of Sept. 14 published a decree which will be submitted to Parliament, to be enacted into a law. According to it, chassis, automobiles, motor trucks, motor tractors, motor fire engines, etc., imported into Italy will be subject to the following scale of duties:

Up to 880 lb., 120 gold lires per 220 lb. ($107 per 1000 lb.).

From 880 to 1980 lb., 115 lires per 220 lb. ($102.50 per 1000 lb.).

From 1980 to 3520 lb., 65 gold lires per 220 lb. ($58 per 1000 lb.).

From 3520 to 5500 lb., 75 gold lires per 220 lb. ($67 per 1000 lb.).

From 5500 to 8800 lb., 95 gold lires per 220 lb. ($85 per 1000 lb.).

Over 8800 lb., 60 gold lires per 220 lb. ($53.50 per 1000 lb.).

On automobiles weighing up to 5500 lb. there will be imposed, in addition to the duty based on the weight, an ad valorem duty of 35 per cent.

Automobile frames will pay 70 gold lires per 220 lb.; change speed gears, 110 gold lires per 220 lb.; complete rear axles, 90 gold lires per 220 lb. In addition, these frames, change speed gears and rear axles will be subjected to an ad valorem tax of 30 per cent.

The new tariff is undoubtedly intended to make the importation of foreign automobiles into Italy very difficult.

A RECENT wage survey covering a period some ten months ago showed skilled mechanics in a typical French automobile factory to be receiving between 26 and 30 francs for an eight-hour-day's work; that is, between $5 and $5.80, figuring the franc at the normal rate of exchange. During the last quarter of 1919, the same class of workers in Italy received from 15 to 18 lire a day; that is, $3 to $3.60. This later survey included all types of manufacturing plants.

Lincoln Body Designs Show Constructive Thought

Six body models provided for use on the new Lincoln chassis. A critical analysis of these models is contained in the following article by an authority on automobile body building. Line cuts of the various models are shown, thus marking a departure from the usual reticence

By George J. Mercer

THE body models of the new Lincoln are eight in number and comprise five and seven-passenger touring, roadster, four-passenger coupe, five-passenger sedan, five-passenger town brougham, town car and suburban limousine. The first five are mounted on the 130-in. wheelbase chassis and the last two on the 136-in. wheelbase.

The touring bodies are here illustrated by the seven-passenger model (Fig. 1) and the closed bodies by a similar illustration of the sedan (Fig. 2). The line drawings show all the models, the essential dimensions being indicated by figures.

These line cuts are worthy of more than ordinary attention, since they show the commendable spirit in which the Lincoln Motor Car Co. has been willing to co-operate and furnish what is generally regarded as "inside information" of the seat sizes, head room, etc. It has seemed strange to the writer that the mechanical parts of a car will be elaborately dimensioned and the reading public fully informed, while the body features will be made to appear mysterious. The Lincoln Motor Car Co. is to be credited with breaking away from this idea.

Body dimensions can be varied considerably, but a body that is a standard model and made in quantities must, in the last analysis, be of proper proportions to fit the average person, and the public should be as conversant with the seating dimensions as they are with the number of cylinders and the bore and stroke figures.

The touring models are similar in design. The five-passenger, which is termed phaeton, is shorter and carries the extra tires at the rear, raked forward, instead of aft as in the larger body. A line drawing of the touring model is shown in Fig. 5 and of the phaeton in Fig. 6. These bodies are conventional in design and present a moderate and conservative exterior. The benefit of the long high hood and shroud or cowl is in the low appearance of the body sides. These are really 23 in. high, but the comparison with the front minimizes this height. Consequently a low looking side is obtained while the height necessary for comfort and protection is preserved.

A front view shows the radiator to be rounded, while a straight effect is obtained by the top side line and the line of bending; that is, the line where the straight side bends to meet the top sheet of the shroud and hood conforms to make a high light that apparently continues the body side line to the front. To carry out this effect ideally, the radius should be smaller than is shown on these models so as to bring the turning point higher, but, provided it is a parallel line as herein shown, the effect is always harmonious.

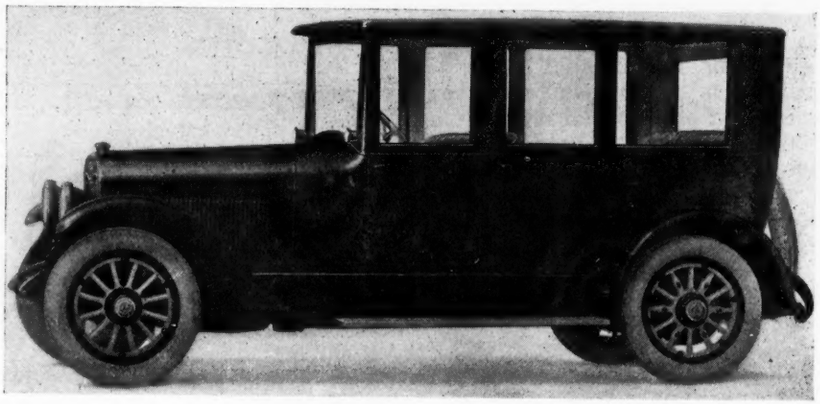


Fig. 2—Five-passenger sedan

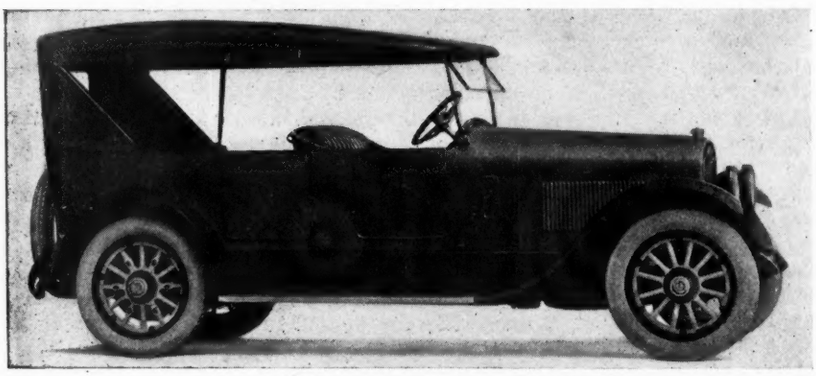


Fig. 1—Seven-passenger touring car

The top edge of the body is flat, with a moulding that is continuous. There is also a moulding edge to the doors. All these mouldings are pressed in the panel and the panels, on the open bodies, are 18 gage steel. All the doors are hinged at the front with concealed hinges and inside and outside door handles. There are ventilators on the sides and the hood louvers are narrow and close. The mudguards are full crown with design pressed edge; they are well-shaped and very strong.

The two-piece windshield is only slightly slanted from the perpendicular and carries small lamps at each side at the base.

The top is of conventional pattern with gypsy quarter and 7½ x 19½ rectangular glass back light. The rear support iron, for the top when down, is carried in the tool kit and adjusted only when wanted.

The sectional view of the tonneau (Fig. 3) will show how the storm curtains are carried when not in use. The back of the seat is pleated the same as the sides and seats and, when closed, reveals no appearance of a door. This view also shows the tonneau light and the flexible robe rail, and in the seven-passenger car there is a plated foot rest.

The other sectional view (Fig. 4) shows the front compartment with pocket in the doors for small tools and a sliding drawer under the seat. This drawer pulls out from the side and is for tools also. The door pocket carries only the light tools. The drawer is accessible without disturbing the person seated.

Fig. 3—Sectional view of tonneau of touring models

The trimming design as shown by the illustrations is the French pleat; the material is black leather.

The line cuts show all the principal dimensions of head room, seat spacing, location of steering wheel, etc., and are ample for anyone wishing specific information of the interior sizes.

The roadster (Fig. 7) carries three passengers. The seating is clover leaf with doors at the front, passage between the seats and luggage compartment at the rear.

The rear mudguards are different from the touring model, but much of the general description given of the former will apply, while the line cut will give all the dimensions required.

The designing of a roadster is more of an open question than any other model. In fact, the roadster is a series of models, and it is a question of picking out the one that your particular trade calls for most. The majority of types consider the feature of carrying an extra passenger. In the design shown, the extra passenger is better provided for than when he must sit in the luggage well at the rear. With a long wheelbase of 130 in., this design has good sound sense for utility, compactness and comfort.

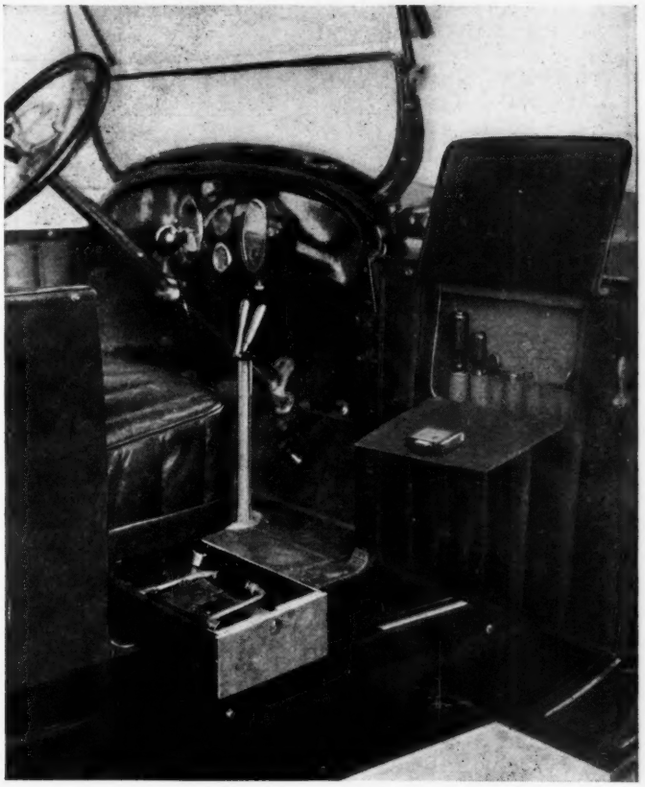


Fig. 4—Sectional view of front compartment

The four-passenger coupe (Fig. 8) has some features similar to the roadster. As regards the rear compartment and the rear mudguards, for instance, the arrangements for seating are similar but more expansive in the coupe. The latter also has individual front seats with aisle between and a right hand seat which folds over for entrance.

The five-passenger sedan is illustrated by a photograph (Fig. 2). This gives a good view of the interior showing the trimming design, curtains, etc. The angle at which the front shows indicates the shape of the lower part of the windshield following the curve of the shroud, and also the blending of the shroud corner with the pillar and the belt molding, which is continuous across the front as well as back. The measure of round on the rear corner is also illustrated.

The drip molding is continuous all around and the top corners of the windows have a small radius. The front pillar is slightly tapered, being about ⅝ in. thicker at the bottom than at the top. This gives enough slant to the windshield glass to obviate reflecting the rays from street lamps. The dash lamps are located at the base of this pillar. The doors have molding all around with small round bottom corners and concealed hinges.

On the closed bodies, the doors are hinged at the rear and all models have full doors.

The straight line effect is fairly well distributed. The roof molding line is straight while the roof is thin and extends sensibly beyond the front glass.

Aluminum panels are used on the closed bodies, 14 gage below the belt and 16 gage above. A line drawing of this model is shown in Fig. 9.

The other closed body on the 130-in. wheelbase chassis is the town brougham (Fig. 10). This is very similar to the sedan in size and design except that there is a division back of the driving seat which makes this model a chauffeur-driven or two-compartment car. The line drawings will amply supply all the dimension data and the gen-

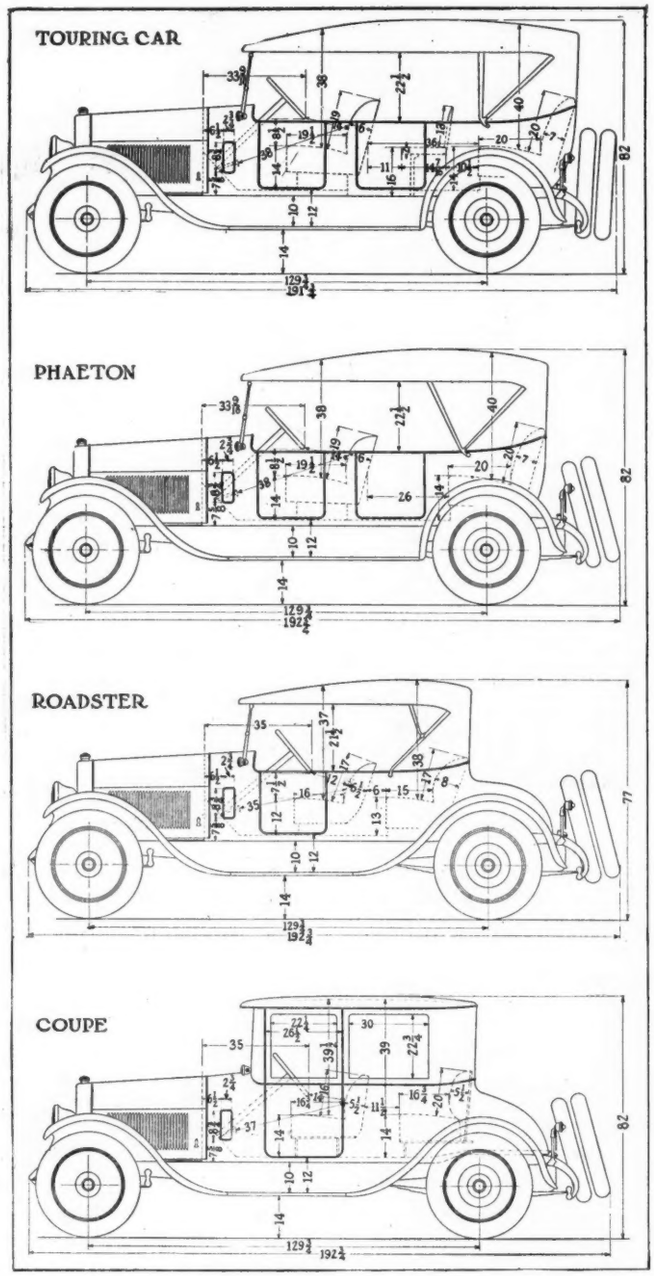


Fig. 5—Touring car. Fig. 6—Phaeton. Fig. 7—Roadster. Fig. 8—Coupe

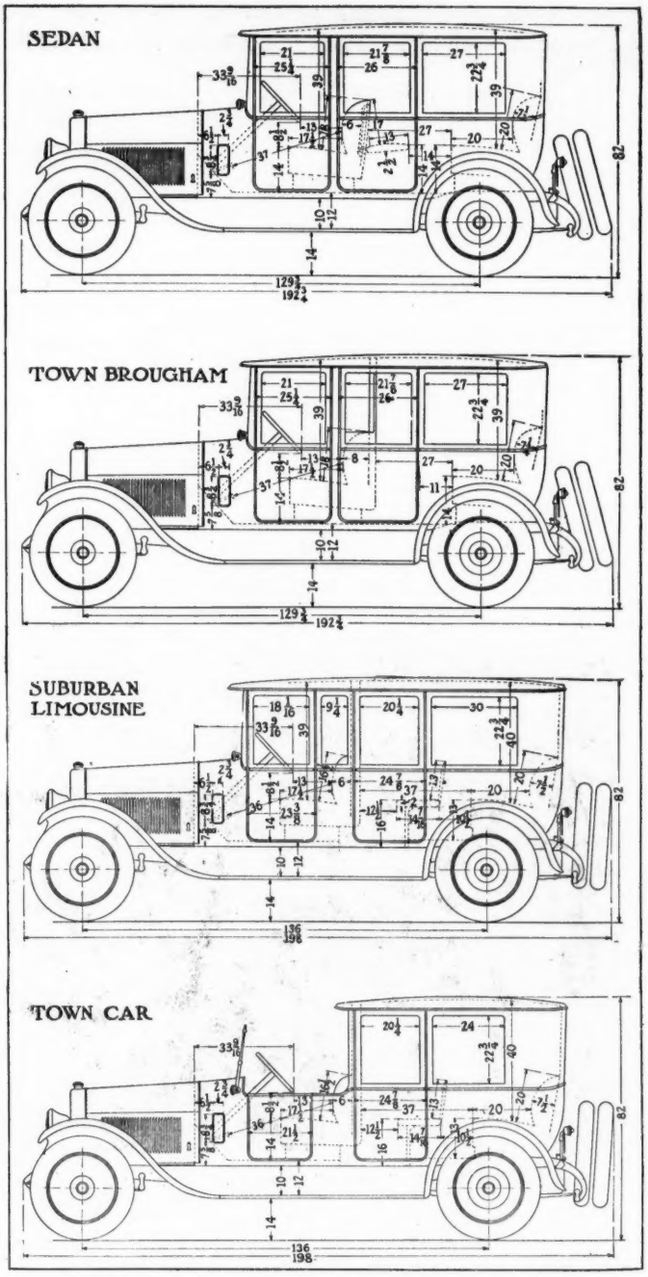


Fig. 9—Sedan. Fig. 10—Town brougham. Fig. 11—Suburban limousine. Fig. 12—Town car

eral description of the sedan will apply for this model as well.

The two models mounted on the 136-in. wheelbase chassis are a suburban limousine (Fig. 11) and the town car (Fig. 12), both of which are illustrated by line drawings.

The first named has a seven-passenger body with adjustable glass division at the rear of the driving seat. The town car, as its name implies, is one in which the chauffeur is entirely outside.

The interior trimming design on all closed models is the French pleat and the material is varied, customers being allowed to choose from a sample case. There is one dome light in the roof and no reading lamps. The colors are blue body with belt stripe and blue wheels with striping and black enamel hoods, radiators and mud guards.

The range of body models is, to say the least, comprehensive. Every model that belongs to this type of car is at hand. All the body models show the result of careful, deliberate and constructive thought. The final effect of this work has produced a full line of high class, well designed and harmonious models that attract one by virtue of real merit.

Uniform Garage Charges in Paris

A UNIFORM rate for garage charges has been established at Paris, according to the American Chamber of Commerce in Paris, which states that the arrangement was made by the Chambre Syndicale du Commerce Automobile and the garage proprietors. Cars having a length of 3½ meters will be cared for on a basis of 150 francs monthly; up to 5 meters the charge will be 210 francs and above that the rate will be agreed upon. The daily rate for cars with a maximum length of 5 meters is 10 francs. Clients are informed that "in order to take advantage of these prices they must buy their supplies, such as gasoline, oil and tires, from the garage."

The British House Lighting Sets and Sales Problems

The manufacture of this equipment has been a war-time development and the formation of the sales has not kept pace with the production. Garagemen have not met the opportunity offered to them. Ship lighting plants are quite an item in manufacturing development.

By M. W. Bourdon

PRIOR to the war it was difficult for the house-owner desiring to install a small electric house-lighting set to find a British standardized equipment or an assembled outfit. But now there are fully a dozen British concerns prepared to supply reasonably priced standard installations of from ¾ kw. up to any size that may be required. Nevertheless, the smallest sizes are obtainable only from four or five makers. Among these, the four-cycle water-cooled engine with single cylinder predominates, but one small set has a two-cycle engine, while another has air-cooling with an aluminum cylinder having a cast iron liner, detachable head and overhead valves.

Austin alone among automobile manufacturers is interested in these small house-lighting sets, and has a range of five standard sizes with engines varying from a single-cylinder of 3½ hp. to a four-cylinder of 22 hp., the prices varying from $650 complete to $3,700 without battery.

Dealing generally with house-lighting sets of all sizes, the non-automatic plant is most common. In fact, not all the small sets of ¾ to 1 kw. capable of supplying current for 30 to 60 lights are automatically regulated. One compact outfit, the Pelaphone, with a two-cycle engine built into the dynamo casing, starts automatically when the batteries are discharged and stops automatically when they are charged. Aster, who makes the air-cooling set referred to, merely provides for motoring the generator by a hand controlled switch. Austin, however, goes all the way, and not only arranges for the automatic control of engine starting and stopping, but provides for complete self-regulation by fitting a thermostat which changes over the fuel supply from gasoline to kerosene after the engine has warmed up from a cold start. In sets above 1½ kw. crank starting prevails.

In the small sets, the water circulation is by thermosyphon, and a cylindrical tank with a good head above the engine is used as the water container. In the larger outfits, pump circulation predominates, with a truck type of radiator of the vertical gilled tube pattern and having behind it a cowled belt-driven fan. Austin uses for his smaller plant a house-lighting type of cast iron radiator with six vertical tubes 4 ft. 6 in. in height. This is fitted in conjunction with thermosyphon circulation.

There is no uniformity in engine lubrication systems, which vary from the simple drip and splash to the hollow shaft arrangement giving oil under pressure to main and big-end bearings with splash to the cylinders.

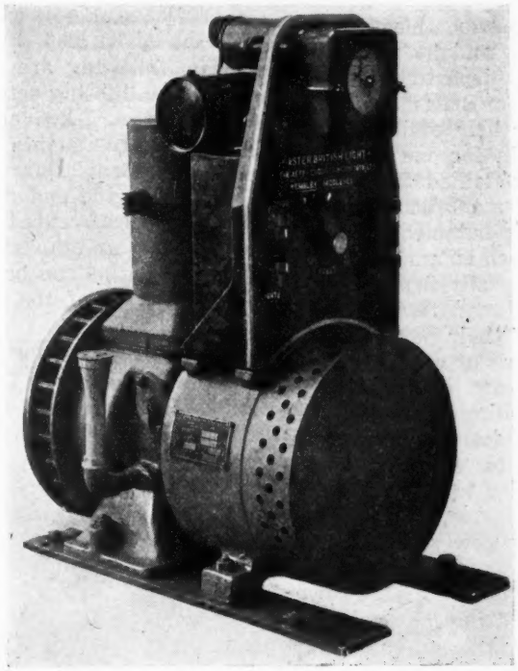


Fig. 1—Aster 1-kw. outfit with air-cooled engine

The great majority of house-lighting engines use gasoline for starting and kerosene as the normal fuel. Vaporizers generally consist merely of exhaust jacketed mixing-chambers, while in one or two cases no special provision is made other than a hot air pipe.

There are in England at the present time more concerns offering ships' lighting sets than those for house-lighting. These marine equipments are all of the four-cycle type in engine design, and run up to high powers, but as a rule the engines only are supplied by the manufacturers, the customers of the latter being electric lighting contractors.

There is no settled policy among makers as to merchandising house-lighting sets. It certainly is not considered that the average garageman is in a position to run a satisfactory sales and service organization with his present facilities and staff. He might be able to place a few sets casually among his local customers on the private car side; but his capabilities in this way are limited, for, while his personality counts within a defined sphere, it does not extend over more than a fraction of the ground to be covered.

To make a success of the house-lighting business from his own standpoint, and from the standpoints of the maker he represents and the man he supplies, he has got to go into it all the way; in other words, he must organize a special department with a responsible and capable man in charge, one with experience not only with internal combustion engines, but with all the many details of the in-

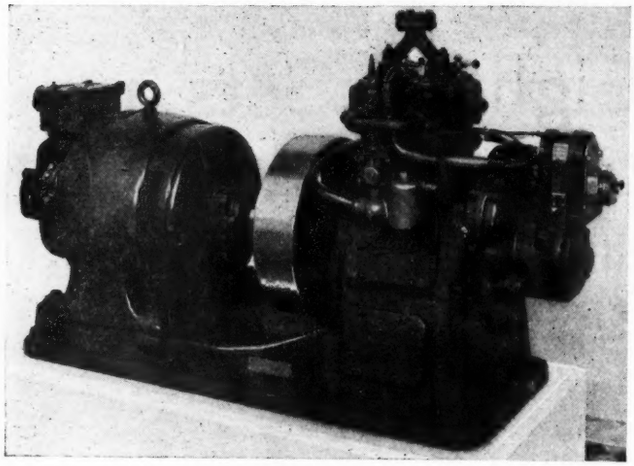


Fig. 2—Austin 2.1-kw. equipment with 3½-hp. two-cylinder 3 x 3½ in. engine

stallation that have to do with the generation of current, control, wiring and so forth. He must have capable men for wiring the houses of purchasers, for the latter will not be satisfied with handing over a check for a generating set; obviously they will want the plant, wiring and lamps installed and will expect satisfactory service subsequently.

At present, then, the garageman is not able to handle lighting sets from beginning to end, and he will not be able to do so until he runs a special department for the purpose. As a result, the men to whom British equipment makers are looking to merchandise their outfits are the house-lighting contractors, and Austin for one announces to the public that his sets "can be obtained from house-lighting contractors and from the manufacturers," no mention being made of garagemen or automobile dealers.

But the question is not settled by such an announcement. The makers of these small sets are mostly firms that are primarily internal combustion engine manufacturers, and whether they are going to dispose of their house-lighting equipments through electrical engineers or otherwise, this part of their business will not be a mere side line but an entirely new branch, one that will require a separate sales staff with experience in handling electrical equipments and preferably some personal acquaintance with the house-lighting engineers and dealers who are to be approached to act as agents.

But even so, the house-lighting engineer cannot give complete service. Neither he nor his usual staff have any more than a smattering of knowledge concerning the power plant; they are as much at a loss in fitting up, tuning, or repairing an internal combustion engine as the garageman is in doing similar work on a generator, switchboard or wiring.

No matter from which end one looks at this house-lighting business, it is apparent that it is a specialist's job. There must be departmentizing by both manufacturer and dealer.

In England the solution of the problem, in the writer's opinion, appears to be for the maker to allocate a wide area to each of a number of the biggest garagemen who will agree to run a separate department. These area dealers must appoint sub-agents in every small town, who will bring their personal influence to bear upon likely customers in their localities and be able to call in the specialists from the area dealer's staff when questions of installation and purely electrical matters crop up for discussion, contract or service. The latter will probably more often relate to the power plant, and the local garagemen will be able to tackle this side without assistance.

At present there is no one in whom the prospective purchaser can repose his entire confidence. He may trust the local electrical engineer to see him right in the electrical details of the equipment, both in selling him an outfit and providing service; but he well knows that this class of dealer may be even more ignorant concerning the power plant than he is himself. The garagemen he would trust to sell him a satisfactory engine, but he well knows the shortcomings of this man on the electrical side. But if he be approached by the local garageman, knowing that the latter has behind him the staff and facilities of an area dealer running this business as a special department, he will realize that satisfactory installation and service can be provided.

The alternative cuts out the local sub-agents, and involves the area dealer in a direct sales campaign over his whole district; the question is whether he will in many cases be prepared to launch out to this extent into an entirely new field.

Whatever plan he adopts, however, he must departmentize; if he does not, he will see the house-lighting business go past him and be taken up by the local house-lighting engineer, who, as matters are, may well be looked upon by the prospect as the lesser of two evils. But this will not be conducive to the best possible volume of sales, and therefore the manufacturer will suffer. Once more, then, it comes back to the latter, and he, through a special department under a capable chief, will have to organize and supervise a plan of campaign not only for the factory but for the dealer also.

The following are general particulars of typical British house-lighting sets:

Aster.—A 1-kw. equipment which it is intended to make in large quantities. It has an air-cooled engine and the equipment generally bears close resemblance to the Delco. Engine and dynamo are mounted as a unit, with the armature secured to a spider forming a prolongation of the engine crankshaft. The control is non-automatic, but the engine can be started by motoring the generator. The latter is of the four-pole pattern and runs at 1000 r.p.m.

The air-cooled engine is a four-cycle type, with a bore and stroke of 2 7/16 x 3½ in. It has overhead valves actuated by push rods in a detachable cast iron head, the valve rocker pins operating in oilless bushings. The cylinder is of aluminum with a cast iron liner and has longitudinal

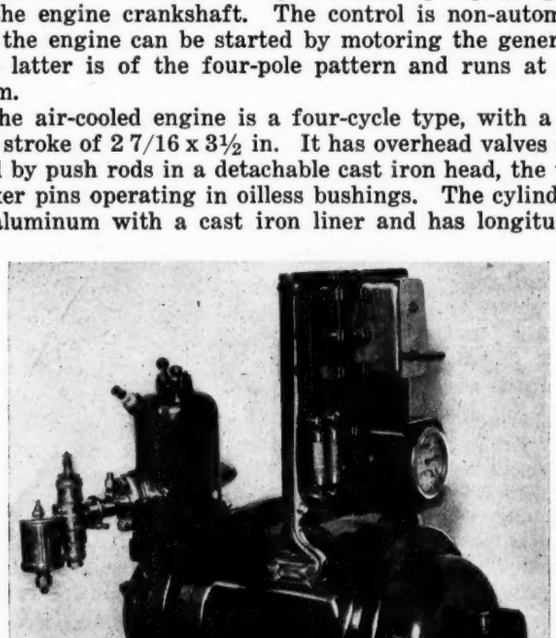


Fig. 3—Pelaphone ¾-kw. automatic installation; has two-cycle 3 x 3½ in. engine, with flywheel in generator casing

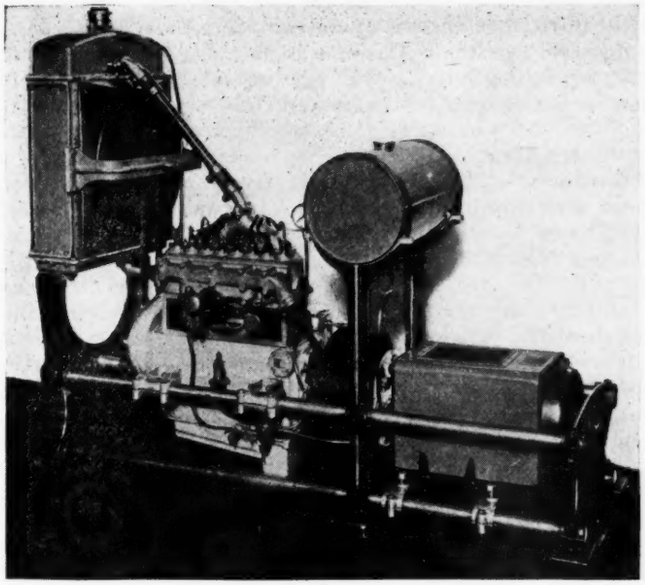


Fig. 4—Fyfe-Wilson 4½-kw. outfit on tubular base. Has a 10-hp. four-cylinder block engine of light car type

fins enclosed in a detachable sheet metal jacket, the latter having a cap of similar material enclosing the cylinder head and valve gear. The piston is also of aluminum, has three compression rings and a fourth ring locating the piston pin, which floats in the piston bosses and in a phosphor bronze bush in the small end of the connecting rod.

Air is drawn through the cylinder casing from holes in the cap by an exhauster type fan which forms the flywheel. The crankshaft runs in roller bearings, a ball thrust bearing being provided at the dynamo end. Lubrication is on the circulating splash system, with a plunger pump, while ignition is by battery and coil, the contact breaker being mounted on the end of the transverse camshaft, itself driven by skew gearing and enclosed within the crankcase. The switchboard is mounted over the dynamo. The price of the complete installation with a battery of 14 glass cells having a capacity of 170 amp. hr., is $810.

Several larger sets for house and ship lighting are also made under this name. These, however, have engine and dynamo separately mounted on a base plate with a coupling between the two shafts. An example is the 2 kw. set with a 6 hp. single-cylinder four-cycle engine, with drip and splash lubrication and burning either gasoline or kerosene, the price being $900 for engine, generator, switchboard, etc., but without battery. Another typical set is a 6 kw. outfit with a 9 hp. two-cylinder 3½ x 4¾ in. engine, having hollow shaft lubrication. This equipment sells without battery, but otherwise complete, at $1,425.

Austin.—The smallest equipment of a range of five types is the ¾ kw. set with a compound wound dynamo which, at option, may be 25 volt, 30 amp. or 50 volt, 15 amp. A single-cylinder water-cooled four-cycle 2¾ x 3½ in. engine, rated at 1¾ hp. and running at 1100 r.p.m., forms the power unit; it is mounted on a cast iron bed plate with the dynamo. Full automatic control is provided, the engine being self-starting, self-regulating and self-stopping, while a thermostat control is provided for the change over from gasoline fuel at starting to kerosene for normal running. Thermosyphon water circulation is used with a house-heating type of radiator intended to be mounted adjacent to the engine and dynamo unit on a separate concrete base. For ignition a coil system is used, the current being taken from the batteries for starting and from the dynamo direct for normal running. This installation, complete with a 14 cell 144 ampere-hour battery, is offered at $650. The next largest size, the 2.1 kw., has a two-cylinder 3 x 3½ in. water-cooled engine, the dynamo voltage being 50 to 70. Full automatic control is provided, and the price for the complete outfit without battery is $1,200.

A 3.6 kw. 140 volt plant has a four-cylinder 6-7 hp. three-cylinder 2½ x 3½ in. engine. This outfit without battery sells at $1,600, equipped for using gasoline as fuel. It is also supplied for burning kerosene at a small extra charge and can be had either in the automatic control type or hand-controlled.

The largest set has a 22 hp. four-cylinder engine, using either gasoline or kerosene, and running at 800 r.p.m.; the dynamo generates current at 100 volts, the output being 90-100 amperes. All Austin lighting sets, except the smallest size, have a centrifugal type governor acting on the carbureter throttle. Separate cylinders are general, and when kerosene is to be used as fuel, an exhaust heated vaporizer is fitted with two float chambers, one serving for gasoline for starting. The thermostat control for the change-over valve appears on all automatic models, and the same applies to magneto ignition.

Pelaphone.—Engine and dynamo are mounted as a unit in the ¾ kw. set, which is supplied in two models, either 25 volt or 50 volt, both with a shunt wound generator. The flywheel of the two-cycle 3 x 3½ in. engine is arranged within the dynamo casing and serves to form one end-plate for the armature. The switchboard is mounted above the generator. The outfit is fully automatic so far as starting and stopping the engine is concerned, and is sold complete with battery for the 25 volt set, including all piping, stand for water tank, muffler, fuel and water tanks (latter 18 in. diameter by 48 in. high) at $700. The engine runs on gasoline and has splash lubrication, the oil being fed by drip into the induction pipe. Coil and battery ignition is used; no governor is fitted to control the normal speed at 1100 r.p.m.

The larger Pelaphone sets have separate units, the engine and dynamo being directly coupled on the same base plate. The range comprises 2½, 5, 8 and 10 kw. sets, with one, two, three and four-cylinder engines, respectively. The latter are of the four-cycle type, all with a bore and stroke of 4½ x 5 in., with separate cylinders, L heads and magneto ignition. Kerosene is the normal fuel, vaporized

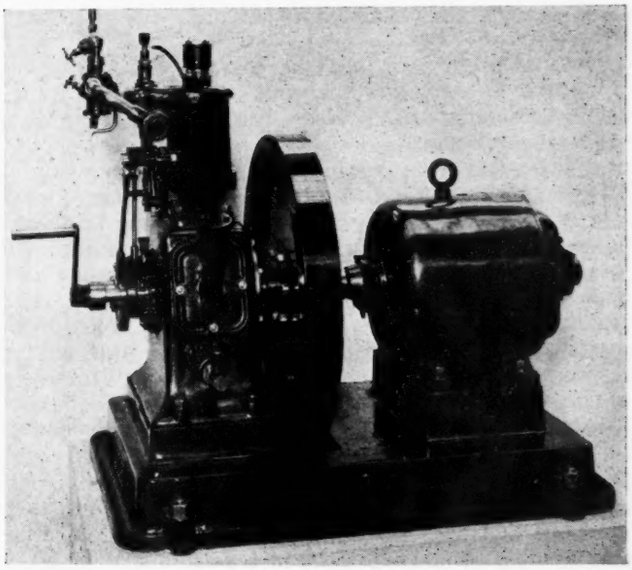


Fig. 5—The Gardner ½-kw. set. The 1¼-hp. engine burns kerosene, has eccentric valve gear and hit-miss type governor

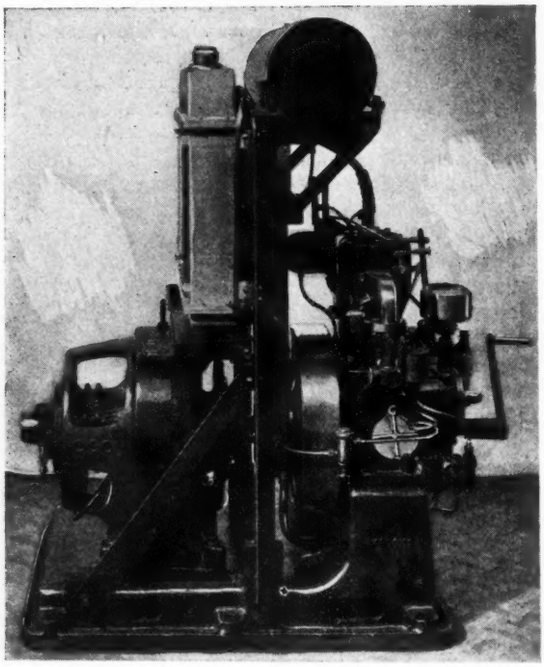


Fig. 6—The Parsons 4-kw. set has a 7-hp. single cylinder 4½ x 6 in. engine burning kerosene

in a combined inlet and exhaust manifold. All except the single-cylinder model have hollow shaft lubrication with a plunger type pump. Prices for the complete installations are: One-cylinder, 2½ kw., $1,000; two-cylinder, 5 kw., $1,480; three-cylinder, 8 kw., $2,100, and four-cylinder, 10 kw., $2,475.

Fyfe Wilson.—The standard set is a 4½ kw. outfit, a special feature of which is the tubular base in lieu of a cast iron bed-plate. This base consists of four longitudinal tubes formed into a unit by three transverse castings through which the tubes pass. The engine, a 10-hp. four-cylinder, 2 9/16 x 4 5/16 in. block casting of the light car type, is supported by the upper tubular members, while the generator to which it is connected by a flexible disk coupling rests upon bracket clips on the lower units of the base. A gilled tube car type radiator, with a fan surrounded by cowling and belt-driven from the engine crankshaft, is mounted on the forward cast member of the base, while upward extensions of the central member support the cylindrical fuel tank. Gasoline is normally used, and crank starting is depended upon. The engine has hollow shaft lubrication, magneto ignition and thermosyphon water circulation. This outfit without switchboard or battery is offered at $1,000.

Gardner.—A big range of electric generating sets for house and ship lighting, cinema work, and other purposes, includes a ½ kw. set with a single-cylinder, four-cycle, 1¼ hp. engine. This is a medium-speed power unit with water-cooling, and has more features in common with gas engine practice than with automobile engine design. For instance, the valves are operated by eccentrics and coupling rods, the engine speed being controlled by an inertia type governor, acting upon the inlet valve on the hit-and-miss principle. High tension magneto ignition is used, and a splash system of lubrication. In the cylinder head is a scavenging air valve, which operates automatically, admitting air to the cylinder when the inlet valve is closed by the action of the governor.

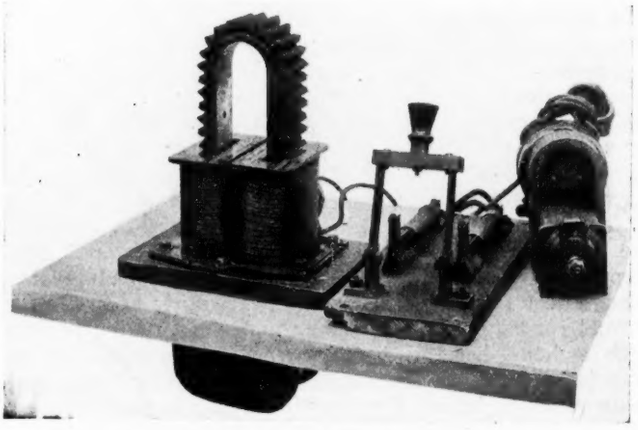
Parsons.—Ship lighting rather than house lighting is the purpose of the electric generating equipments bearing this name. The smallest outfit is a 4 kw., with a single-cylinder 4½ x 6 in. engine running at 900 r.p.m. This is of the four-cycle type with L head, magneto ignition, gear pump for oil circulation and an eccentric water pump. The normal speed is 900 r.p.m., controlled by a centrifugal type governor. Engine and generator are directly coupled, but mounted independently on a cast iron bed-plate, which has bolted to it at the center a vertical channel iron frame supporting the gilled tube radiator and cylindrical fuel tank. A cowled fan driven by a flat belt from a pulley on the crankshaft is arranged behind the radiator, which incidentally has a drip tray beneath it. A heavy cast iron flywheel is fitted, being 22 in. in diameter and having a 4 x 4 in. solid rim. Kerosene is the normal fuel, starting being by crank, using gasoline. This equipment is sold at $3,150 without switchboard or battery.

Dixon.—The smallest outfit bearing this name is a 1½ kw. set and sells at $760, complete with switchboard and battery. It is of the non-automatic type and has a 3 hp. single-cylinder four-cycle 3½ x 3½ in. engine, with a normal speed of 1200 r.p.m. The engine has hollow shaft lubrication with a plunger circulating pump. Water-cooling is effected by means of a truck type tubular radiator.

New Magnetizing Outfit

THE greatest difficulty in the assembly and repair of magnetos and electrical instruments is to insure maximum charging of the magnets and to get them into place without losing a large portion of the initial charge. A new equipment for charging permanent magnets has been put on the market by the Esterline Co.

The apparatus consists of the charging coils, a U-shaped keeper and a flexible keeper. After the magnet has been charged it is partially withdrawn from the coils, the U-shaped keeper rising with it. Then the flexible keeper is placed on the outside and the magnet put in position on its frame. Thus the loss in magnetic strength while transferring from the charging coils to the permanent location of the magnet is practically eliminated. We understand that the apparatus has been adopted by manufacturers of magnetos and instruments, and by many repair plants and service stations. The coils are wound on bronze spools, and can be furnished for any commercial direct current voltage.



New magnetizing outfit

Tendencies of British Chassis Design Noted at Olympia

Last week Mr. Bourdon discussed tendencies of British engine design. This week he extends his observations to the chassis. It appears that, to a large extent, the British designer again exhibited his first post-war design, but many details are new and of considerable engineering interest.

By M. W. Bourdon

THE cone type of clutch, either of the internal or external pattern, is by far the most prevalent in British practice, being used in double the number of cases in which the single disk clutch appears. This actually represents an appreciable gain upon last year, a fact which is difficult to understand were it not for the fact that each car manufacturer makes his own clutch and probably finds this type a simpler manufacturing proposition.

Cone clutches are frequently enclosed when they are of the inverted type, as in Humbers, where provision is made for the introduction of a special oil to keep the leather in good condition. Generally, however, a fabric facing is used; in some cases, as in the new Crossley, with supplementary springs under the fabric to ensure a smooth engagement. In the new Phœnix the enclosed cone is of aluminum without facing and runs in oil, an arrangement which this maker has favored in the past and has found to give satisfaction.

The multiplate type of clutch has slightly increased in favor, but instead of running in oil with metallic contact between the plates, it frequently has fabric facings on alternate members. Armstrong-Siddeley provides an example of this design, the plates being exposed and running dry. Wolseley still favors the multiple clutch running in oil, but Lanchester has a single disk instead of the multiplate type of pre-war models.

Clutch pilot bearings in all types of clutches are mostly plain bushes with exterior means of lubrication, but a ball-bearing at this point is occasionally used, as in the new 20-hp. Crossley, while the Bean has a roller bearing. Armstrong-Siddeley with a dry multiplate clutch has a concentric oil chamber around the pilot bearing with a capacity sufficient to provide continuous lubrication for several months' use. The 15-hp. Humber, which has hollow shaft lubrication, has the drilled hole through the rear main journal continued through the pilot, the oil finding its way to the plain bush through the end of the hole, which is plugged with wool to prevent over-oiling.

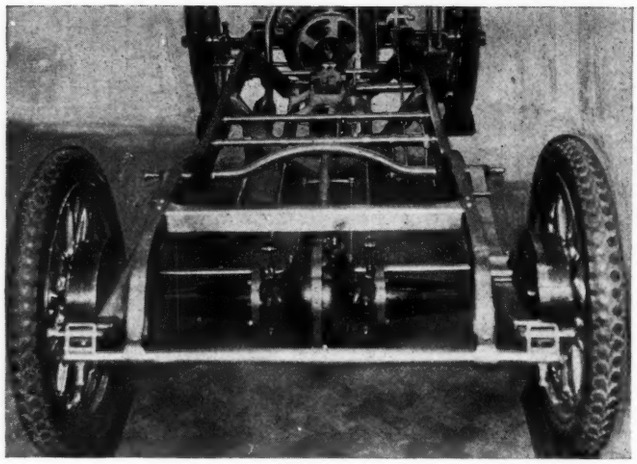
With unit power plants the clutch is generally connected to the gear-set by a solid shaft or one with merely a flange coupling, but this practice is not universal; Angus Sanderson and Phœnix, for instance, have found a flexible disk coupling joint of advantage in the open clutch pit of the unit power plant. When engine and gear-set are separately mounted, the fabric disk joint, duplicated, is rapidly becoming universal, though Sunbeam and Wolseley are among the exceptions to the general rule, the former having star and block joints, while Wolseley has fabric disk and sliding block types.

As previously mentioned, gear-sets are, in the majority of cases, separately mounted from the engine, 70 per cent being thus arranged against 20 per cent as a unit with the power plant, the remainder being located as a unit either with the torque tube or back axle. One frequently observed form of support for the separate gear-set is a pair of tubular cross members with three or four point suspension, though there is no uniformity in this respect, and Wolseley, for example, uses one tubular and one pressed steel cross member, while Napier has a single point suspension from a cross member at the front and two-point at the rear from brackets projecting from the side frame members. Apparently the most popular arrangement of any is to suspend the gear-set at three points from two pressed steel cross members, but even so the three-point suspension principle is only partially carried out in the majority of cases and no form of flexible anchorage occurs between the gear-casing and its means of support, so that frame distortion is still to a certain extent communicated to the aluminum box.

The gear-set of the eight-cylinder Leyland is supported at each end by a pilot extension of its casing, these extensions passing through the large central hole of two deep pressed steel cross members of the frame. The inner circumference of each hole is grooved so that with a leather packing ring of square section it constitutes a form of gland in which the gear casing floats, though it is prevented from moving rotationally by two pegs or keys.

Right-hand control for the gear shift lever is still favored, being found on 74 per cent of British cars, though a good proportion of post-war models have the central lever, for example, Armstrong-Siddeley, Austin, Napier, Cubitt and Phœnix, but an equal number have again adopted the right-hand control, which occurs in, among others, the new Crossley. Where the central control lever is used, it is often arranged in a gate, mounted on a sliding shaft instead of being spherically pivoted. This is sometimes accounted for by the fact that the gear-set is too far back in the frame to allow the lever to come through the front floorboards in a convenient position if it were mounted directly on the lid of the gear-set. As a result, a great deal of the manufacturing advantage of the central lever is lost and selector rods are still required. On the other hand, both Austin and Napier, who could, by reason of the position of the gear-set, arrange for a spherical joint for the lever, prefer to give it a sliding shaft and mount it in a gate.

There is no general tendency in one direction or the other as between dog clutches and the internal gear type for the direct drive. Ball bearings very largely predominate for the main shaft, and Wolseley is exceptional in



A British production job (reputed). Rear of 12-hp. chassis. Four-passenger recently dropped $500 in price; now sells at $2,600. Four-cylinder integral L-head engine, 2 9/16 x 4¾ in.

using Timken rollers; but for the layshaft approximately 70 per cent of cars have plain bushes, and more often than not the shaft itself is a fixture in the casing, while the gear sleeves rotate on it, either with bushes driven into them or upon floating bushes.

There is no general tendency toward the use of ball or roller bearings for the main shaft pilot, but it is rapidly becoming standard practice when a plain bush is used at this point to drill a hole or two holes through the constant mesh pinion between pairs of teeth, so that oil is forced through to the interior bush by the meshing of the two gear wheels.

Propeller Shafts

The Hotchkiss drive—an open propeller shaft, and the torque and drive taken by the rear springs—is used in approximately half the total number of cars. A torque member with an open shaft (as found on the Vauxhall, for instance) is rarely used. The completely enclosed shaft within a torque tube is used in 40 per cent of cases, the remainder embodying a system which is increasing in favor on British industrial vehicles; that is to say, about two-thirds of the propeller shaft is enclosed within a tubular torque member, and an open coupling shaft extends between the gear shaft and the front joint of the propeller shaft proper. While this arrangement seems to have advantages in trucks, where usually the propeller shaft would otherwise be of considerable length and therefore liable to whip, no advantage is apparent in connection with private cars, especially where it results in the propeller shaft itself being decidedly short and therefore prone to submit its joint to considerable angularity. This arrangement is found on the 15-hp. Wolseley and the Ensign Six among others, while Napier affords an example of the Y head torque member with the universal point exposed between it and the gear-set, the front end of the propeller shaft being allowed freedom inside its tubular casing and therefore having a flexible joint at the rear end to connect up to the bevel pinion shaft.

Torque tubes in most cases have the spherical front end forming approximately half the casing of the universal joint, the other half being fixed to the gear-casing, and not infrequently the oil in the latter can penetrate to the joint through the rear ball-bearing. As a rule, some provision is made to prevent the oil leaking back to the rear axle through the torque tube, but there are exceptions, and in one case, that of the new Blackburn, it is intended that the rear axle lubrication shall be maintained by oil finding its way from the gear-set; and yet no provision appears to be made for preventing the rear axle casing from being over-filled, though drain pipes are arranged at each end to allow any excess to run off. This has the appearance of being a wasteful form of construction without presenting any advantages.

Propeller Shaft Joints

The rapidly increasing popularity of the fabric disk joint for clutch shafts and propeller shafts is a pronounced feature of current tendencies. For propeller shafts it is found in 34 per cent of the cars at either one end or the other; taking open shafts only it occurs at both ends of 28 per cent. Frequently (in the Standard, for instance), no sliding joint is embodied, the flexible disks being called upon to absorb variations in axle position relative to the gear-set, due to spring movement, and having their star bosses pinned and brazed to the shaft ends.

Next to disk joints, the plain bearing star or ring type is the most popular, while ball bearings are used for this type of joint in eight cars and roller bearings in two others. The sliding block joint, sometimes known as the De Dion type, and consisting of square blocks able to slide in grooves in the casing and to rotate on the T ends of the shaft, are also popular, being used usually in conjunction with a star joint at the opposite end of an open shaft.

The flexible disk joint has, of course, overcome the need for giving thought as to means of lubrication, but where one form or other of metal joint is used there is far more evidence than in the past of an endeavor to lubricate it automatically or semi-automatically.

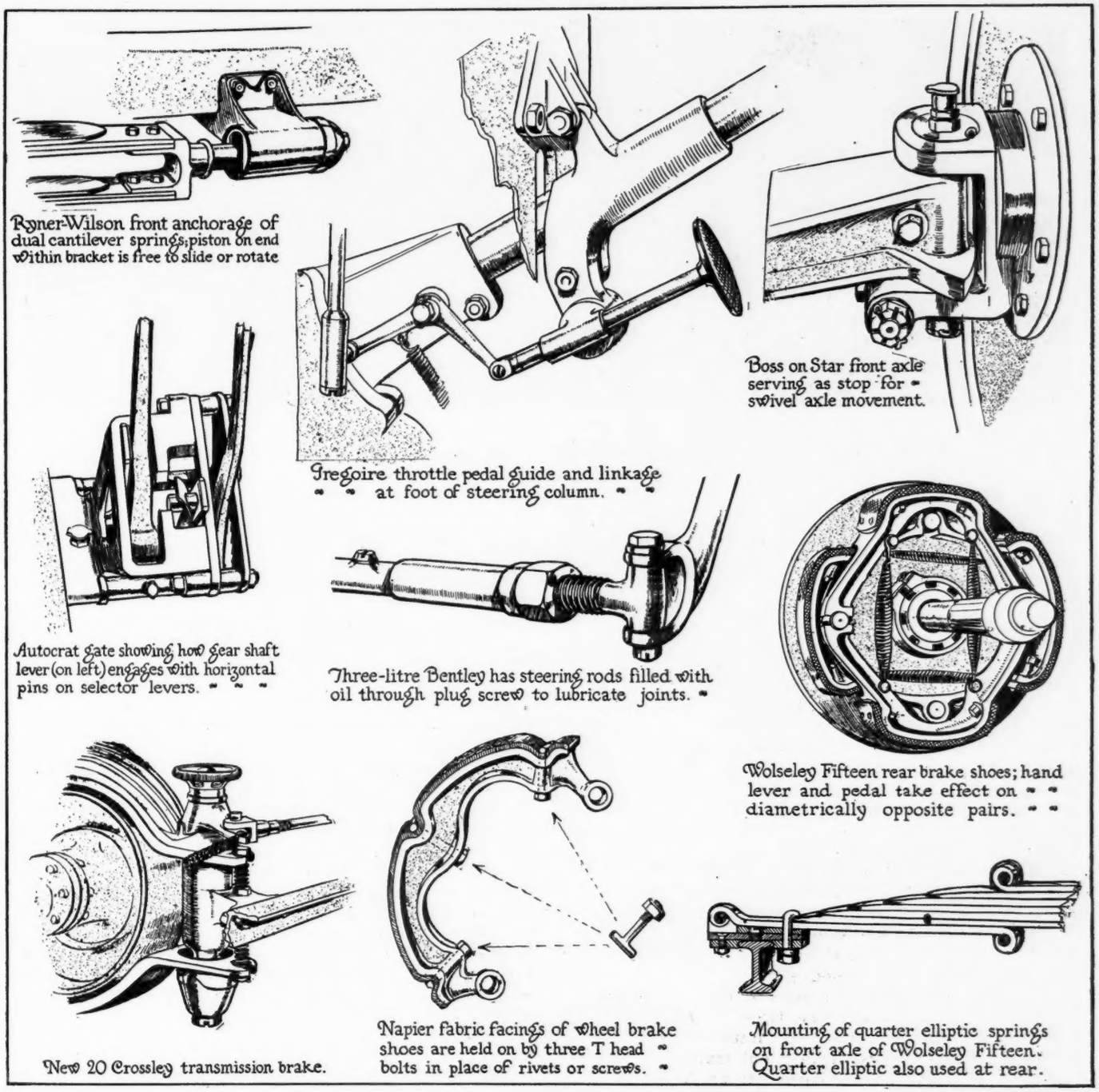
As already mentioned, front joint housings are frequently in communication with the lubricant in the gearbox when a torque tube is used, but this is also the case in one or two instances with an open shaft. In the Sizaire Berwick, for example, which has a block joint at each end of an open shaft, these joints are supplied with oil from the gear-set and back axle respectively. When lubricant, either oil or grease, must be introduced by hand, it is becoming general to arrange for its introduction at a point where centrifugal force will have the effect of carrying it to the bearing surfaces instead of away from them. Napier has this arrangement with star joints, the pins of the latter having blind bushes so that the lubricant cannot escape at the outer ends.

Rear Axles

Every imaginable combination of aluminum, cast steel and pressed steel is visible in rear axle construction, the only marked tendency being to adopt aluminum for the central portion; there are only isolated examples in new cars with unfamiliar names having tubular extensions integral with the aluminum center, and these have flanged ends with bolted-on cast steel final extensions to carry the springs, bracket anchorages and wheel bearings. Nor is any tendency evident in favor of full, half or nonfloating axles; they are all represented on all types and sizes of cars.

Final Drive

As might be expected, the spiral bevel has gained a lot of ground from both the worm and the straight bevel, though there are several of the largest and best-known makers still retaining one or other of these earlier types. Among the high-grade cars, Lanchester, Daimler and Wolseley, adhere to the worm, the first two still using the Lanchester hour-glass type, but Rolls-Royce maintains the straight bevel, and Napier, Ensign, Guy and



Ryner-Wilson front anchorage of dual cantilever springs; piston on end within bracket is free to slide or rotate

Gregoire throttle pedal guide and linkage at foot of steering column.

Boss on Star front axle serving as stop for swivel axle movement.

Autocrat gate showing how gear shaft lever (on left) engages with horizontal pins on selector levers.

Three-litre Bentley has steering rods filled with oil through plug screw to lubricate joints.

Wolseley Fifteen rear brake shoes; hand lever and pedal take effect on diametrically opposite pairs.

New 20 Crossley transmission brake.

Napier fabric facings of wheel brake shoes are held on by three T head bolts in place of rivets or screws.

Mounting of quarter elliptic springs on front axle of Wolseley Fifteen. Quarter elliptic also used at rear.

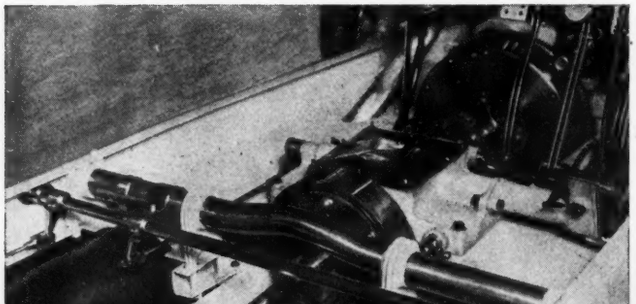
Armstrong-Siddeley have spiral bevel. The respective percentages of these drives are, approximately, 43 per cent spiral bevel, 25 per cent worm and 26 per cent straight bevel, the balance being concerned with the smaller types of runabouts, which mostly have roller chain drive, usually with a friction transmission.

Brakes

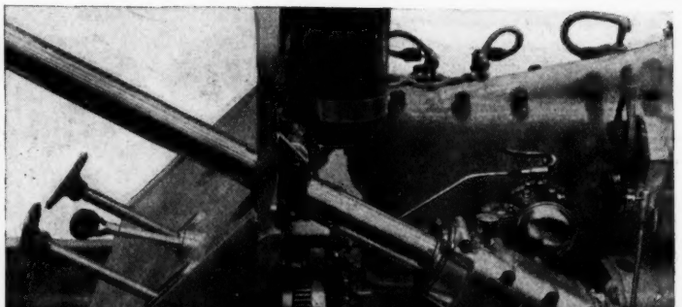
There has been something of a "landslide" in connection with brake location, for the current tendency is to relegate both sets to the rear wheels; but it is distinctly the exception to find an external band brake on the rear wheel drums, the usual arrangement being two pairs of expanding shoes side by side. Exceptions to this occur in well-known cars; for instance, Rolls-Royce has concentric shoes in the drums, Wolseley has, on two models, four segmental shoes in the same plane, the two pairs of opposite segments being actuated by hand lever and pedal respectively. On the other hand, Daimler still persists in maintaining a band brake on the rear wheel drums, this being operated by pedal, while an external transmission brake behind the gear-set is applied by the lever.

Where both brakes are used on the wheels, 90 per cent are internal. Comparing the use of two sets of wheel brakes with that of one transmission brake and one set on the wheels, the percentages are 61 and 39, which represents a considerable gain for the former, as until last year it was cause for remark when a British car was observed with both brakes on the wheels.

In connection with brake connections, there is a tendency to return to the use of steel wire cables in place of rods. Austin uses them and this lead (if it may be so termed) has been followed in a number of small cars. It appears, however, that in some cases cables appear to have been adopted to help out the designer from some



Rear suspension of Humber Fifteen sub-frame for engine (3⅛ x 5½) and four-speed gear-set



H. E. adjustable brake steering column. Gear housing mounted on bracket on aluminum base plate of hood

difficulty, rather than because they are better in service, more economical in production or more direct in application than rods.

Wheels

Wood wheels may be said to have practically disappeared from British cars, though one of the makers with the biggest output, Austin, still retains them. The pressed steel hollow-spoked type is used in approximately 50 per cent of cases, though the wire-spoke pattern is holding its own in really high-grade cars; the disk wheel with single plate is gaining rapidly, though it has been dropped by those firms who took it up tentatively and whose rear axles have straight bevel drive, for it was soon found that the disks acted as sounding boards to the hum of the gears. Riley, who at one time supplied a lot of wire wheels to the trade, is now making a laminated disk type with three plates attached to the hub and only the largest one to the rim.

Rudge-Whitworth and Dunlop continue to hold the field in wire wheels, but Sankey, who originally had matters all his own way with the pressed steel type, has now a serious competitor in Goodyear.

No British car maker has yet standardized detachable flange rims and straight-side tires, though many tire makers are able to supply the latter as well as the clincher variety (beaded edge), but mainly—if not entirely up till now—for replacements on American cars. A rumor that Rolls-Royce will standardize straight side tires is neither confirmed nor denied when the question is put.

Springs

While a year ago a sudden increase in the popularity of cantilever type of spring was noted, the majority of new makers have adopted some other form. Several manufacturers who adopted cantilevers in a hurry for their post-war models have realized that a good suspension is not necessarily obtained merely by utilizing one system of springing or another. There has been a certain amount of trouble with the application of the cantilever system, this being principally concerned with rolling and excessive rebound. These troubles have been overcome to a certain extent in some cases by increasing the number of leaves, though, strangely enough, Rolls-Royce has gone in the other direction, and the latest model has only six leaves 2½ in. wide; five of these are ⅜ in. thick and one, the main leaf, ½ in. in thickness. Yet Rolls-Royce has 14 leaves in the front semi-elliptics, the two longest being 5/16 in. thick and the others ¼ in.

A type of spring which is increasing in favor and has advantages from the manufacturing point of view is the quarter elliptic. This has been adopted by Wolseley for two models, and provides an exceedingly good suspension. An advantage from the user's point of view is that this system can be adopted so as to eliminate all bearing surfaces requiring lubrication, for the butt ends are secured to the frame side members and the other ends to the axle.

Actually, quarter elliptic springs are used at the back of 18 per cent of cars, a percentage which differs but slightly from that of full cantilevers. Arrol-Johnston has discarded the full elliptic spring for the rear and adopted the three-quarter elliptic. With one or two exceptions there are no peculiarly distinctive spring arrangements, though the Ryner Wilson, a newcomer, has duplicated cantilevers at each side, drop forgings at one unit of each pair arranged above the other, united by forked front and rear and having the ends secured to pistons, one free to rotate and slide in a cylinder and the other able to rotate only. The same arrangement occurs at the front of the car, where semi-elliptics are found.

Steering

Current tendency in regard to steering gears is to use the worm and complete worm wheel arrangement, the use of the worm and nut or worm and segment being exceptional. It is infrequent to find any provision for taking up axial play of the worm wheel shaft. The tendency, at one time observed, to fit ball thrust bearings to the worm shaft has died away, and plain thrust rings with some form of adjustment are usually preferred where any adjustment at all is provided.

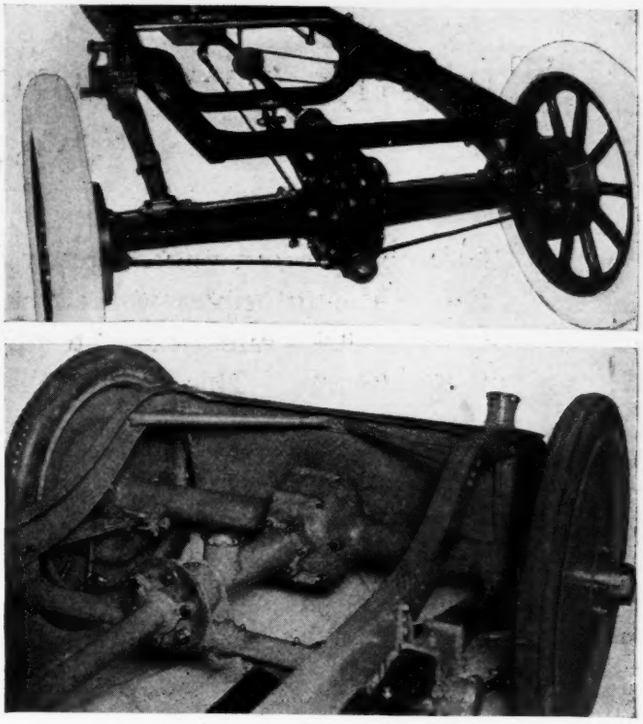
The use of disk wheels has encouraged a few makers to adopt central steering pivots. Armstrong-Siddeley and Riley (the latter a light car of good reputation but small output) have their steering pivots vertical immediately over the point of tire contact with the ground, and there is no question but that these two cars have the lightest and most free-from-shock steering equipments of British cars. True, they present but little improvement over those cars in which the axes of the inclined pivots produced coincide with wheel contact, but in the writer's opinion there is some advantage, small though it may be,

when serious inequalities of the road or obstructions are encountered by the wheels. The majority of the cars, however, have vertical pivots, though the wheels are usually slightly splayed by the pivot pin being set slightly from the horizontal.

Electrical Equipment

The two-unit system for lighting and starting is fitted on the vast majority of British cars, and the single unit is a standard type with only one or two makers of electric outfits, Lucas being the principal representative. The Bendix drive for the starter is general, though Lucas still has the magnetic engagement in his two-unit system. Where the electrical equipment of so many British cars fall short is in the drive of the generator, which in 80 per cent of cases is by a V-belt instead of directly.

Twelve-volt equipments are still in the majority, though there is a tendency to adopt the six volt set on the recommendation of the electrical firms. The latter are also recommending ground return wiring, but this is met with only in isolated cases. In connection with electrical equipment generally, the writer ventures to prophesy that within twelve months there will be found a pronounced movement toward ground return wiring, 6 volts, direct driven generators and small head lamps secured to the front fenders, eliminating side lights and head lamps of large dimensions. The reason for the last mentioned forecast is the probability of lighting restrictions of a somewhat drastic nature being imposed next year by the Ministry of Transport, which will render large headlamps illegal and tend to induce economy in lamp equipment by encouraging a cross between side lamps and head lamps mounted on the fenders in order to comply with a continuance of the regulation which insists upon at least one pair of lamps indicating the full width of the car.

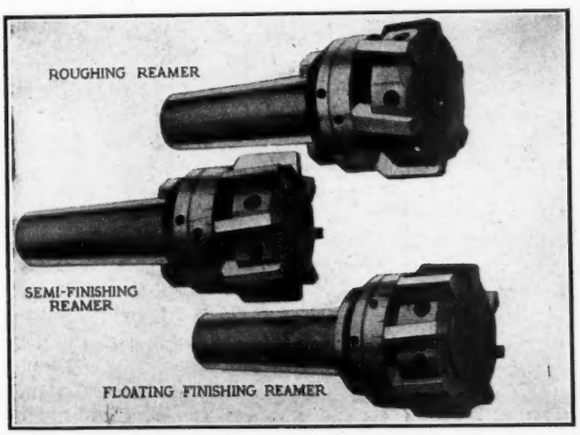


Top—Method of resisting torque when cantilever springs are used with an open propeller shaft and worm drive; lug on axle center has tubular extension under propeller shaft linked to cross member. New British light car, the Wilton. Bottom—Short semi-enclosed propeller shaft of new Seabrook "sports" car. Torque tube pivots on tubular member that forms trunnions for cantilever springs. Note axle oil filler on torque tube

Cylinder Reaming Set

A NEW cylinder reaming set has been added to the reamer line of the Wetmore Reamer Co.

The roughing reamer is of heavy construction with adjustable and replaceable blades set at a right hand angle. The semi-finishing tool has left hand angle blades and it is claimed that it will produce a smooth round hole when backing out. A modification of this reamer is designed for line and pilot reaming. The floating finishing reamer has the float in the head of the tool directly under the strain, a feature which eliminates the tendency to get out of parallel or cramp. The float is an improved Oldham type having rollers instead of sliding contacts. The float mechanism is protected from dust and grit by a cap covering the front and a washer protecting the back. The blades of this reamer are set at a left hand angle and staggered. Expansion and adjustment to thousandths of an inch are accomplished by means of a graduated micrometer lock nut located at the rear of the blades. Present standard sizes are 2 7/16 in. to 5 9/16 in.



Cylinder reaming set

A Protector for Twist Drills

IT is said that 90 per cent of small drill breakage in production work occurs just as the drill breaks through the under-surface of the article being drilled. When the drill point approaches the under-surface of the work, the resistance of the material rapidly breaks down, and unless the operator carefully feels his way through, the drill moves forward faster than the cutting edges can remove the metal, acting more like a screw than a twist drill. If the drill is small and the metal tough, the drill is almost certain to break.

A device designed to prevent such breakage has been placed on the market under the name of the Martian Drill Protector. It comes into action just when the drill is about to pierce the under-surface and is claimed to prevent it from feeding too fast. When the protector is properly set, the operator can detect no change in the "feel" of the press, and the resistance is shifted to the mechanism of the protector. This device is manufactured by the F. S. Machine Specialties, Inc.

Making the Punch Press Safe and Efficient

Safety devices on punch presses have usually meant decreased production. The principles worked out in a large Western concern prove, however, that safety may be attained together with a decided increase in production. This article tells how these results were accomplished.

By Norman G. Shidle

THE punch press has probably recorded more industrial accidents than any other single type of machine. Between its powerful jaws innumerable hands and fingers have been paid as toll to increased production. The safety movement, so successful in many other parts of industry, seems to have made less progress in the field of punch presses than elsewhere; that is, it has seemed very difficult to render these important machines safe for the operator and at the same time capable of efficient production.

But it can be done. And as in many other cases, a detailed explanation of the method brings surprise rather because of its simplicity than because of its complexity. A. L. Kaems, safety engineer of the Simmons Co., has proved to his own satisfaction and to the satisfaction of many others that practically every punch press operation can be so arranged that the operator need not put his hands between the jaws of the press at any time, and that this arrangement can be such that production will be increased rather than decreased.

His theory is that the piece should be pushed or slid into the die, instead of being placed there by the operator. To understand how this principle may be carried out in practice, an examination of the work done along these lines at the Simmons Co. will be of value.

Every operation or die requires a separate and specific device. No general safety device or production help can be arranged that will be suitable for every operation, although the device for several operations may be very similar. Consequently, the proper equipment of all the dies in a plant of any size is the work of several years and cannot be accomplished without a great deal of time and effort. The results possible, however, as shown by the work at this plant, fully justify all the time and the small expense necessary.

The difficulty of devising a means of sliding or pushing the piece into the die will, of course, differ very greatly with various dies. Some adapt themselves readily to this method, while others cannot be adapted without the exercise of considerable ingenuity and experiment. Problems of every kind have been met with in the work of this plant, and practically all of them have been solved.

Fig. 1, for instance, shows an operation in which the piece is simply slid in by the operator. This die was originally constructed exactly opposite to the way it is shown in the photograph; that is, the round part lay at the end farthest from the operator. It was found that by turning it around and cutting away a part of the die, the piece could be slid in, since the round part is larger than the straight piece and will not go through the space in the die allowed for the latter. A small guard stops the operator's hand from slipping too far when sliding in the piece, and the piece is kicked out automatically after the operation is completed. Consequently the operator's production is limited only by the speed with which he is able to slide the piece in and trip the press. He is never required to place his hand between the jaws. Production on this job was increased about 55 per cent after the introduction of this device.

Another case in which a change in the die was necessary to insure safety is shown in Fig. 2. Standing beside the press on the table is shown the die with the piece placed on it as they appeared before the operation was studied and changed; that is, the die was located in the bottom of the press and it was necessary for the operator to reach in to place the disk on the pin.

To allow the disk to be slid in, the part of the die referred to was placed in the top of the press and the forming die changed to the bottom. A slide was then attached to the forming die. The operator now merely slides the disk in and trips the press, while the disk is automatically ejected from the forming die. This job was rather dangerous; the present method is obviously safe. And under the present method production averages 37 per cent higher than before.

In each of the cases described, it will be noted, the press was tilted to allow for sliding. In some cases, however, this is not feasible. Fig. 3, for example, illustrates another forming job on which the press was not tilted. In this case, a slide was made separately and so adjusted that the piece falls from the slide accurately into the die. The short stroke does not allow for automatic ejection of the piece, so the operator knocks the piece out with a stick. When the operator used to do this job by placing the piece in the die, production was 26 per cent lower than at the present time.

The operation illustrated in Fig. 4 is similar to that shown in Fig. 3, except that the stroke of the press is long enough to allow for automatic ejection of the finished piece. The operator merely slides the piece in and trips the press. By this method an increase in production of nearly 50 per cent was achieved.

When the operation is such that the finished piece can pass through the die, one problem is, of course, eliminated —that of removing the piece from the die. Fig. 5 shows such an operation. Again the piece is slid into the die, the operator's hands never coming near the danger zone. The finished piece passes through the die. When the operator placed his hands under the jaws to insert the piece, production was about 100 per cent less than at the present time.

Another type of job is shown in Fig. 6. This is a redrawing operation in which the operator was formerly

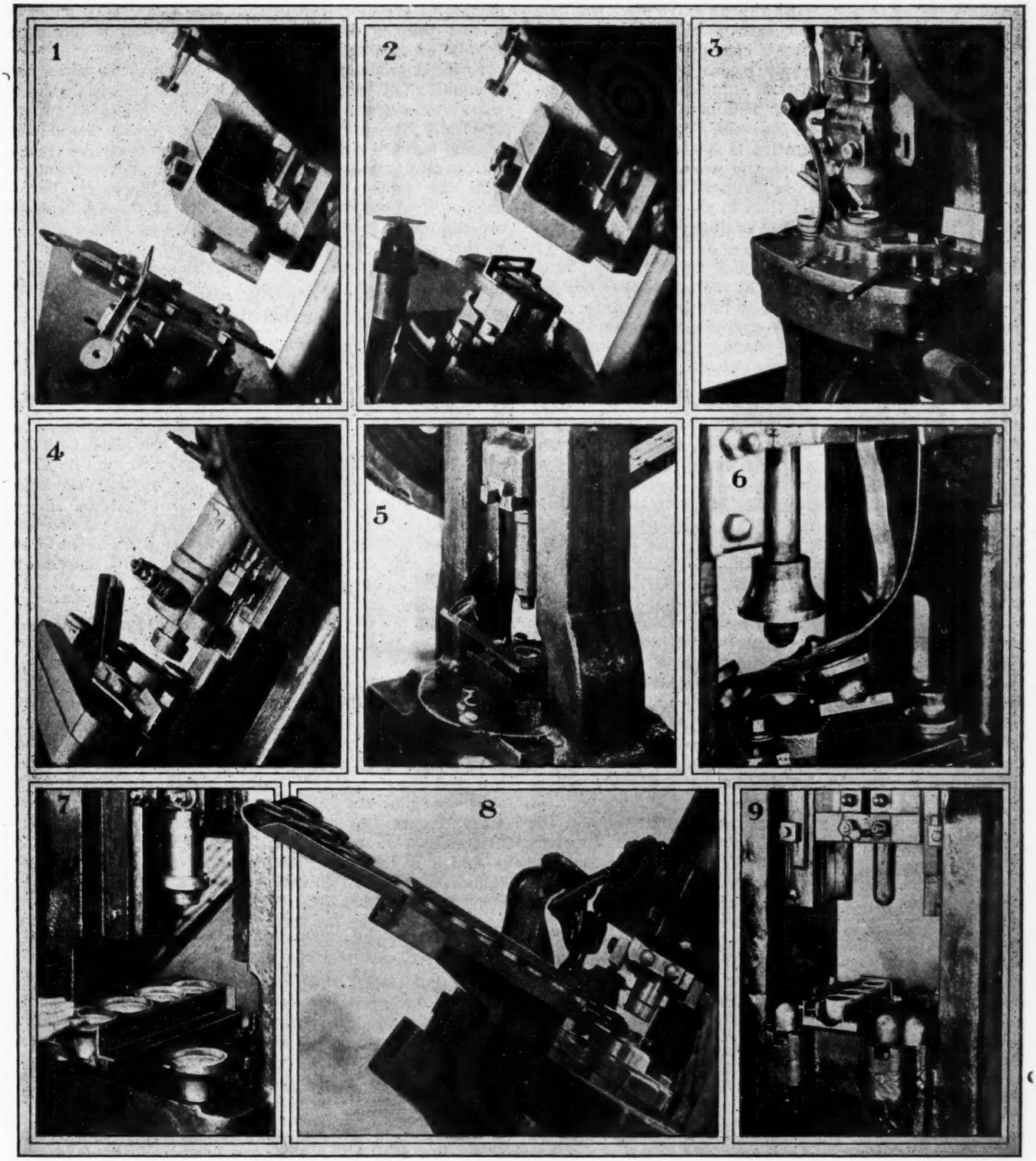


Fig. 1—Sliding work into die; die was reversed to allow this method. Fig. 2—Another operation on which die was reversed to allow for sliding in of work. Fig. 3—Work is knocked out with a stick, because stroke of press is too short to permit automatic ejection. Work drops from slide into die. Fig. 4—Type of slide similar to Fig. 3. Automatic ejection possible. Fig. 5—Work passes through die, so ejection problem is minimized. Fig. 6—Redrawing operation which required considerable experiment and study. Fig. 7—Work is pushed through die. Fig. 8—An automatic feed. Fig. 9—How a difficult problem was worked out. Pieces rounded on end are held in vertical position and pushed under die

compelled to place the piece in the die underneath a stripper located over the die. It was necessary to remove the piece in the same manner.

In attempting to remedy this unsafe condition, the stripper was taken from its position and placed on the ram. This did not work successfully, however, so a piece of spring steel was fastened to the side of the press by a brace. This was successful in that when the piece stripped it struck this spring steel as it descended. The spring steel, however, had to be gotten out of the way of the de-

scending ram. To accomplish this an extra piece was fastened to the cross-head. This extra piece pushes the spring steel out of the way, so that it clears the ram.

A slide was constructed by means of which the piece is slid into the die. It is then automatically thrown out, as shown in the illustration. This new method showed a production increase of 150 per cent.

Another re-drawing operation is shown in Fig. 7. It is possible in this case to push the work through the die, and the operation has been so arranged that the operator's hand need not come nearer than 21 in. to the jaws of the press. The production increase on this job was 50 per cent.

An automatic feed was arranged for the trimming job shown in Fig. 8. Here the operator needs only to place a number of pieces in the holder at the top of the slide and the pieces then fall automatically into place. Before this method was worked out the operator was compelled to place each piece in the die by hand. The new method resulted in a production increase of about 125 per cent.

The last photograph, Fig. 9, shows how a particularly difficult operation was worked out in the interest of both safety and production. The job is a re-drawing operation and the work can readily be pushed through the die. The difficulty arises in the fact that the pieces are round on the bottom, so that they will not, of course, stand up straight in an ordinary tray provided for them. To overcome this difficulty, a tray with a rounded bottom was made. Then an extra piece was placed along one side, and tension springs placed between this piece and the wall of the tray. This device held up the heads of the cups and permitted them to be pushed into the die in the proper position. In this case, the new method resulted in an increased production of 66 per cent.

In all these cases where the piece falls from a slide into the die, it is evident that the slide must be inclined at exactly the proper angle to insure the die falling accurately into place. This, of course, means experiment and adjustment, as does a study and readjustment of the dies, and the actual making of the various devices. The devices in themselves are simple, but cannot be prepared without some careful work. The expense involved, however, is slight in comparison with the safety achieved and the production increase. To do this work at the Simmons Co., three skilled mechanics are provided to assist the safety engineer. These men should have the same requisites as a tool maker or die maker, but need in addition imagination and the ability to do constructive work.

Men who have long been used to working from blueprints may be found to be psychologically incapable of original work of this kind. These various devices can be worked out only by experiment and imagination. Consequently, the mental attitude of the mechanics assisting the safety man will be an important factor in working out the principles laid down.

Automatic Feeds in Future

Would not such devices as the dial feed be more efficient in many cases than some of the devices described here? This question will doubtless arise. Mr. Kaems answers by saying that there is no question but that in the future automatic and semi-automatic feeds will be developed and applied almost universally; that even now such devices as the dial feed are in many cases superior to the temporary devices of the type described. On the other hand, he points out, a great deal of expense is involved in the installation of the dial feed, for instance, and for that reason these more permanent devices cannot be universally installed at once.

Much of this work, Mr. Kaems feels, is what might be called "first aid" work. Unless something is done immediately hands and fingers will continue to be lost. Such devices as are described in this article can be installed at a cost that is extremely small, and with a minimum amount of adjustment of the machine.

Reduced production has nearly always accompanied the installation of safety devices on punch presses, and for that reason many manufacturers have hesitated to put them in. Moreover, when such a safety device was put on a press and the piece rate for the operation not increased, the operator usually found that his earnings were reduced. This fact tended to make him adjust the safety device so that it would be ineffective. Both of these difficulties are eliminated in the application of the principle discussed in this article. It is for that reason that the attempt to push or slide the piece into the die in every case is worth investigation and study.

Fear Removed; Production Increased

It is easy to understand how production has been increased in each of the illustrative operations described. The movements of the operator were shortened in most cases, while additional speed was rendered possible by the removing of the fear of injury. That is, where injury is practically impossible, the operator can work with his mind concentrated entirely upon production.

Spoiled work has also been reduced on the operations where these safety principles have been applied. This is accomplished because when the pieces are slid into the die each piece goes in from exactly the same angle, while no man, however skilled or steady, can keep his movements exactly the same over a long period of time.

There are about 3000 different dies in this plant, and during the ten or eleven months that this safety work has been going on about one-third of them have been studied and properly equipped with safety devices of the type described.

Emphasis has been laid thus far upon the production value of these devices, but the real value in saving fingers and hands must be considered as of primary importance. Before this work was begun at the Simmons Co. about the beginning of 1920, accidents were far more frequent than they now are. During 1919 there were 500 per cent more fingers lost than during 1920, since these new principles were worked out.

And it is interesting to note that of the few accidents that have occurred this year, every one has been due to some forbidden act upon the part of the operator. Every accident this year has been of the kind that might have occurred as easily on any other machine as on a punch press.

The problem of punch press safety is vitally concerned with the design of the die and the set up of the machine. Engineers and designers who have in mind the safety problem when laying out dies and setting up machines can do fully as much toward rendering the punch press a safe machine as can the safety engineer. A fuller co-operation between these two executives would be likely to yield excellent results in bettering the situation.

Because each individual die and operation presents its own peculiar problem, it must be the responsibility of the user of the press to provide adequate safety devices. The manufacturer of the press could, at best, provide the press with some type of general all-purpose safety guard, which would be likely to reduce production and thus cause dissatisfaction both to the owner and the operator. A careful study of individual dies, however, such as described, will make it possible to render the punch press not only safer to operate but more efficient in production.

To gain the benefit of such studies and installations as those described, attention must be concentrated upon the human as well as the mechanical side. The human ele-

(*Continued on page* 1133)

Practical Benefits of Truck Body Standardization

It is evident that the truck needs all of the aids in merchandising that can be given to it. There is no better opportunity than through the providing of better and cheaper bodies. This review, by a practical body student, points to various advantages to be gained by standardization.

By Harold F. Blanchard

THERE is a pressing need for motor truck body standardization. While there will always be a certain demand for special bodies of various types, the fact is that the big bulk of motor truck users can be served by just a few types built in a few sizes. Half a dozen different types built in about as many sizes would cover the field with surprising effectiveness.

The benefits accruing from standardization are manifold and are rather equally divided between manufacturer, dealer and user. However, it is not until a careful study of the advantages to be gained by all three is made that the full possibilities of the idea are honestly appreciated.

Briefly the benefits are:

1—Better bodies.
2—Cheaper bodies.
3—More truck sales.
4—Quicker truck sales.
5—More profit for dealer.
6—Less dealer capital involved.
7—Better satisfied customers.

Difficulties in the way of realizing this ideal are:

1—Lack of chassis standardization.
2—Lack of co-operation between manufacturers, dealers and their salesmen to encourage purchase of standardized bodies.
3—Transportation of bodies which are usually bulky; possibility of damage by the railroads; expense of crating.

Since some may object to the idea that better bodies would result from standardization it should be explained at once that every now and then a user requires a body different from any possible standard which might be selected. Yet the bulk of users would find the standard types satisfactory. Some who think that they require special types would learn by experience that standard types would suit them just as well, if not better. The demand for infinite variety is based as much on prejudice as it is on practical experience.

Before proceeding with the discussion, let us review briefly what has been done to date. A few truck makers are supplying their models complete with bodies, including one builder of large trucks. In most cases, however, the body problem is up to the dealer. Dealing with a custom builder has its drawbacks:

His prices are high or his work is poor, and the dealer must wait several weeks for delivery. In general, however, dealers purchasing better class bodies prefer the custom builder to the stock body manufacturer.

The objections raised against the latter are:

Bodies are deficient in appearance and construction; types offered are not the ones in demand in the territory. Many, in fact most, of the difficulties now confronting the stock body manufacturer would disappear with chassis standardization.

With this brief sketch of the situation as it stands let us return to a consideration of the benefits that are to be obtained by standardization.

Such bodies would be better in many ways. They would be lighter, stronger, more durable, of uniform construction and quality and in most cases their dimensions would be more satisfactory than they are under the present system.

It is to be expected that if the demands of the country could be satisfied largely by a few types that great advances might be made in the design of these bodies from an engineering standpoint. The van body built some time ago by the Goodyear Tire & Rubber Co. for its overland service, weighing half as much as the usual design, is eloquent testimony on this point. It is certain that much weight could be lopped off of present types by a better knowledge of the principles involved.

If a body design that now weighs a ton can be revamped so that its weight is half a ton, the saving can be put into ½-ton increased truck capacity or the size of the truck can be reduced just that much. It is difficult to say exactly just how much can be accomplished in this way, but really nothing has been done to date. Progress in the art of body building since the advent of the motor truck would be hard to find with a microscope. The builders of bodies, small and large, have blindly followed horse tradition.

This lack of progress is largely due to the fact that truck manufacturers have dodged the body problem. They have been content to furnish the chassis and let it go at that. The chassis is one thing and the body is another, and the two are bolted together. It is not so certain but that there is great opportunity for improvement by a closer relationship between the two units. Specific suggestions along this line are useless for it is too big a problem for one man to solve; it is a problem for the truck industry as a whole. However, it does not seem improbable that changes in the truck frame will eventually be evolved so that it will offer a more satisfactory support for the truck floor with the elimination of stringers and cross-pieces, or some sort of a compromise where the construction of the body foundation is simplified and weight is reduced without loss of strength.

However, regardless of the trend that truck body de-

sign does take, the fact remains that there is a great need for the study of body designs by the best engineers in the country. Progress cannot be made as long as the bulk of the body business is in the hands of local body builders and it cannot be expected that this condition will change until the conditions hampering the sale of stock bodies are removed. Therefore, improvement in body design hinges on the removal of these adverse conditions, and this can only be accomplished by the closest co-operation between truck manufacturers, truck dealer and body manufacturer.

Progress in body construction cannot be expected from the local body builder because he is hampered by tradition and has not the technical training to advance even though he wanted to. The stock body manufacturers, on the other hand, have instituted some noteworthy improvements. But even they hesitate to make more than detail changes in body construction. Considering the present state of the industry, to cast aside standard practice and begin all over again from the ground up would be fatal. There would be too much sales resistance to overcome both among dealers and users. Strangely, they are not in the same boat as the truck or the passenger car manufacturers. From time to time these have completely revamped their designs, the new product selling largely on their reputation as manufacturers of successful automotive equipment.

Only when the stock body manufacturers are sufficiently powerful, and possess the confidence and gain the co-operation of truck manufacturer and dealer can progress be expected. And then only when the hampering conditions now governing the body business are largely removed, and when these companies are in a position to hire and make full use of the best engineering brains to solve both design and production problems.

However, even though there are no radical improvements made in bodies, the general use of standardized bodies will bring with it a decidedly improved product. Better bodies must be the total result. This applies to custom built bodies, although some will maintain the contrary. It is admitted that many custom bodies are about as good as they can be. But even the best of these bodies, constructed with the most conscientious care, are deficient in some particulars.

These bodies are built according to the experience of the builder and few there are that would pass uncriticized under the inspection of a competent engineer. The body may be sufficiently strong, and the materials and the workmanship may be just right. But even so, it is almost certain that the body builder, being a practical man who is following custom, has gone to more expense in working out certain details than is necessary. It is almost certain that iron will be found where it does no good, even though it may do no harm. Wasted effort is apparent in the construction of almost all good bodies. This naturally adds to the price.

But not all custom bodies are well built. The average truck dealer is in the market for a pretty good body at a medium price. The cost of his truck and the character of his trade makes this necessary. These builders turn out a great deal of work that is not satisfactory and this matter is a very tender spot among the truck dealers.

In general the methods and equipment of these builders are very crude. Often they have no woodworking machinery beyond a band saw and a couple of circular saws. Mortises, stake pocket sockets and similar work must be done by hand. This takes time and in their hurry the workmanship is usually poor.

It is common practice to fit a stake or upright so loosely in its hole, either through carelessness or intention, that it is necessary to drive in wedges to take out the play.

Naturally, bodies that are loosely fitted together soon become wobbly, moisture gets in between the joints and rotting of the wood adds to the difficulty. The net result is a body with greatly shortened life.

However, the greatest difficulty the dealer has with the average body builder is to get just what he specifies and here is where his salvation lies in the development of the stock body industry, inasmuch as what he wants is already built and waiting for him; he can look at it and tell in a moment whether it fills the bill or not. **When a dealer orders a body for a customer he is buying a pig in a poke.** He gives the body builder brief specifications of what he wants; the body builder says, "Yes, I know," and starts in sawing up his lumber probably without the formality of making even a rough sketch. The body is sawed out and assembled stick by stick and piece by piece.

This is wasteful and primitive. Much slower than milling all the wood to predetermined dimensions and assembling it. Furthermore, it has the added disadvantage that mistakes are frequent. Pieces are made too short and too long entailing waste of good lumber or patching, and the latter is much more frequent than a glance at the finished job would indicate. Sawcuts are made too deep and are filled with putty.

The general result of this situation is that unless the dealer finds one body builder who is satisfactory and sticks to him, he is never certain of how suitable the body he orders will be. Dimensions of slats, uprights, flooring, etc., may be wrong. The workmanship may be crude in spots or wholly. Various details of the body may differ from standard practice and therefore be unsatisfactory. The body may lack appearance, grace of line. Screws may have been used where bolts were expected. Bolts and screws may be the wrong size. There are myriad ways that a body may be unsatisfactory.

The cost of truck bodies is much greater than it should be, and this statement applies particularly to custom built jobs.

What can be accomplished in this line is strikingly illustrated by the low prices of some types of bodies that are built in large quantities according to modern production methods. For example, a certain Western body manufacturer makes a rack body for a one-ton truck that is sold in rather large quantities. It is a well constructed body yet it retails for the low sum of $125. The same body, reproduced in all its details, would cost $300 if built by the average local body builder.

The cost of the lumber in this body is about $10, that is, if the lumber is purchased in quantity, although the cost to the local builder would probably be $30 or more. Ironing of the body is a modest figure in the case of the quantity manufacturer and a very large figure in the case of the local builder.

So the quantity manufacturer because of his greater purchasing power obtains his iron and his lumber at a comparatively low figure but after all the largest part of the saving of the difference between $300 and $125 **is to be found in the difference in labor.** The custom body man makes his body in hand to mouth fashion. He saws out a stick and puts it in place, then he saws out another stick and puts that in place and so on until the body is completed. The time spent in walking from lumber pile to saw to body is in itself a large figure. The word saw is used advisedly as many of them have no other equipment beyond two or three power saws.

Low body prices are largely confined at the present time to the smaller types which are produced in large

quantities. The stock bodies for the larger trucks are not very much lower than the prices for similar custom jobs for the reason that these bodies are not turned out in sufficient quantity. Their main selling point therefore is: Immediate delivery.

Often the sale of a truck hinges on how quickly delivery can be made, the delivery of the truck complete with body ready for service; the chassis by itself is no use.

Sometimes a truck prospect will hesitate a long while about buying a truck, yet when he is actually brought to the closing point he wants the truck immediately; in 24 hours, perhaps. In many cases there is good reason for his hurry; he has new business which must be taken care of at once; or the truck he has been running, which has about served its usefulness, has broken down. At any rate he wants a new truck at once. Consequently, he is very likely to buy from the dealer who can make the quickest delivery.

If the dealer has a suitable body in stock or if there is a stock body representative in town with a suitable body the solution is easy.

Many times where the stock bodies available are not the type desired the purchaser, of urgent need, will take a stock body that he really does not want. A better stock body selection would greatly help this condition.

The main reason, however, for expecting a general increase in sales as a result of a reasonably complete standardization of truck bodies, lies in the fact that the bodies could be made and sold much cheaper than now. There is no doubt but that a good, husky body for a three-ton truck which now brings, say $500, could be made and sold at a profit at $250 if production methods were used, and the lower price would increase sales.

If the use of specially built bodies were the exception rather than the rule, the dealer would benefit not only by increased sales because of the lower prices at which production bodies can be sold but in many other ways.

He would make a profit on the sale of the body; this profit he does not now realize in a great many instances. He does not obtain this profit unless he handles the body and in many cases he refuses to assume this burden for the many reasons already detailed. If he does handle the body he may not obtain a profit because in many instances the local body builder and the stock body representative are both only too willing to sell the truck purchaser at the same discount that is allowed the dealer, and the customer usually knows this.

If truck body demand, by general standardization, were focused on a few types, satisfactory in style and quality, the dealer could afford to carry stock bodies buying direct from the manufacturer, and eliminating the profit of the local representative. The profit which he would make, while attractive, would not seriously detract from the saving effected by building such bodies in quantity.

If standardization were carried out with proper completeness it is really doubtful whether the dealer would require any additional capital to carry the bodies he would need to have in stock.

And if there were local stock body representatives and their wares were such that the dealer could look to them in nine out of ten truck sales, the capital he would require would be much less than is now needed, the reason being the length of time his money would be invested in a truck would be much shorter than it is now. At the present time in the average case the dealer's investment does not end when the customer says he is ready to buy. The body is still to be built before the truck can be delivered. This usually takes three weeks and sometimes requires six weeks or more. All this time the dealer's money is lying idle in the truck. This is one reason why some dealers refuse to have anything to do with the body problem.

The worst of it is that it is difficult to depend on the promise of the local body builder. If he is rushed with work he may promise to finish the body in two weeks and take six. Meanwhile the dealer may have made arrangements with his bank to help finance him over a certain active period. He may have rightly counted on delivering this particular truck in three weeks from the date the body order was placed.

Let us say that the price of the truck complete with body is $5000, and that there is a note due at the bank about the time the body was to be finished. Assume that the dealer needs a large part of price of the truck in order to meet the note. Delay in delivery, therefore, means that the dealer cannot meet the note on time, which situation is likely to cause the dealer more or less difficulty at the bank.

This situation will be largely wiped out by the general use of standardized bodies which will naturally be ready for immediate delivery. It should not take more than an hour to mount a body on a truck, although now it often does. **Consequently, there is no reason why the customer cannot take delivery the same day that he decides to make the purchase, unless the body is to be painted.**

It is safe to say that if nine of ten trucks could be delivered as soon as sold that the investment by the dealer could be cut in half in most cases where the dealer handles the body transaction.

Purchasers will be better pleased with their bodies when standardization is as well worked out as it should be and will be.

Obviously, they will like the immediate delivery feature that now only applies to a minor percentage of the sales. They will like the reduced prices which will obtain mainly among the larger sized bodies, since many of the types for small trucks are now reasonably low priced.

But most of all they will appreciate the change because production bodies must eventually be better designed and better built and of more uniform quality, improvements that must result from the general use of engineering brains which will be employed by the quantity builders, taking the responsibility of design out of the hands of the local builders. This applies, of course, largely to bodies outside of the delivery class. Big body production to-day is mainly confined to chassis of one ton or less.

The general use of standardized bodies will eliminate to a great extent mistakes that now creep in where the man buying the truck has the say regarding how his body is to be built although he may be guided, and often is, by the advice of the dealer. For example, several bodies were recently built for a certain large concern. They were sure of the dimensions they wanted and the bodies were built accordingly. After they were finished it was found that the tops were too low, the result being that every one of them had to be raised six inches. To do this the uprights had to be pieced out. The finished job, therefore, was not as strong or as neat as it was originally and of course the expense of the change was considerable. Instances of this sort could be multiplied indefinitely.

In most cases there is about as much reason for permitting the owner to specify the design of the truck he is to buy as there is for the body he purchases. The truck is sold to him complete, and he can take it or leave it. The same should apply to the body—in the majority of cases. By careful study of the subject by truck manufacturers, dealers and body manufacturers, the details of the types and dimensions of the bodies most suitable for 90 per cent of the truck business should be determined by conference and these designs should be pushed to the exclusion of all others, **except** in certain recognized cases where specially built bodies of different style or dimensions are **really** necessary.

Judging from the types of bodies that are in use in some parts of the country it is plain that the customer often does not know what is best for his needs.

He buys the bodies he does largely because they are the types in use around him. In the end, such men would be grateful if more suitable types were forced upon them by concerted action of the truck industry.

Broadly speaking, the most popular types in New York, Boston and Philadelphia, for example, have much in common in principle although they differ in name and in appearance. But, if this is so, it must be that one of these possesses certain superior qualities that the other two have not, or perhaps a combination type can be evolved that would incorporate the advantages of all three. We are talking now only of the most popular type. It must be self evident that the needs of these three cities are about the same, and that except for local fashion, and its prejudice, the most popular type used in any one of these cities would be found equally satisfactory in either of the other cities. It is difficult to come to any other conclusion.

If this body, with the best features of all three, can be the best seller throughout the Eastern territory it is logical to feel that this type should eventually become the best seller throughout the country.

Following out this line of reasoning, the conclusion must be reached that the majority of truck users would be better satisfied by a few well-developed types instead of by the infinite variety now obtaining. By careful analysis of the many types of bodies now in use, varying in trifling detail, the conclusion that a few types can satisfactorily replace those now in vogue is irrefutable. Concentration on the perfection of a few styles must result in the development of standardized bodies which will be more satisfactory to the customer than any now in use, superior in design, material, workmanship and utility.

Body standardization cannot be satisfactorily realized until truck chassis have been standardized. The truck is the foundation of the problem. Body standardization cannot proceed until the principal chassis dimensions are uniform.

It is desirable to stop and define a few truck body terms since there is considerable variation in their meaning in different parts of the country. The platform of the body rests on several cross-bars mounted on two long stringers which rest on the chassis frame members.

When a truck body platform is mounted on a chassis it is plain that it must fit in several respects. The stringers must be the same distance apart as the longitudinal truck frame members. Also the width of the stringers should be the same as the width of the frame flange. The clearance between the top of the rear wheels and the underside of the body with the truck unloaded should be about 6 in. Therefore if the frame is low and the wheel high, the necessary clearance must be obtained by having sufficient height in stringers, and cross-bars. On the other hand if the frame is high, and the wheels low, even minimum height in stringers and cross-bars may make the clearance between body and wheels more than 6 in. Greater clearance is undesirable because it usually makes loading and unloading that much harder work and it raises the center of gravity of the load, making sidesway and possibility of capsizing that much greater.

With these chassis variations in mind it is plain that the path of the stock body maker who builds a platform that is adjustable to any truck is not an easy one. Where the body hangs low over the wheels it is necessary in some cases to increase the clearance by adding two long strips, one under each stringer. This makes a patchy job, takes time and is certainly not good engineering although it is excusable from a standpoint of expediency. It is usually necessary to arrange the cross-bars so that one will not come directly over the wheels, for in most cases this would reduce the clearance too much. This means that the cross-bars must be shipped unattached OR some compromise method must be used which will eliminate the necessity of long cross-bars at about the points where the wheels may come. One stock body company has solved this problem very nicely by cutting two of the cross-bars off short and reinforcing the platform at these two points by two small angle irons which run the full width of the body. And there are other modifications of this idea. However, the important point to be driven home here is that such expedients and makeshifts would not be necessary if the distance from rear of driver's seat to rear wheels was standardized, a single dimension being selected for each truck capacity. Naturally extra expense and trouble must be involved in building a platform to meet this condition. Construction might be simplified and the cost of manufacture reduced if truck makers would get together on this point.

The fact that frames vary considerably as to width means that the stringers must be adjustable as to width.

In most cases this situation is met by leaving the stringers unattached to the platform. That is, instead of building the platform complete, the platform is assembled minus the stringers and these are only applied when the frame width is known. Attaching the stringers to the platform means that two long bolts running from the top surface of the platform to the bottom of the stringer must be put in place for each cross-bar. If there are seven cross-bars that means fourteen bolts, and fourteen bolt holes ⅜ to ½ in. in diameter and perhaps 12 in. long, each hole being countersunk in the stringer. All that extra work is required simply because frames are not standardized as to width. Naturally, the customer pays for this extra effort; an effort that is considerable when it must be accomplished by hand or with an electric drill, yet an effort that would be very slight if this work could be done in the factory, the place where it should be done.

Sometimes in order to reduce the height of the platform it is necessary to "let in" or notch the cross-bars or stringers, or both. This is extra labor and could be avoided if frame height and wheel diameter were standardized.

Most people consider a platform construction in which cross-pieces and stringers are "let in" stronger than where letting in is not employed. But with the usual stock body platform whether this can be done or not depends more or less on the clearance that must be obtained between the rear wheels and the under side of the

(*Continued on page* 1133)

Sweden as a Present and Prospective Market

The use of automotive vehicles, as well as the local idea of the kind of vehicle desired, is based chiefly upon the unsatisfactory condition of the roads. American cars lead there but Germany was an important competitor for this trade before the war. Improvement of roads on way.

A REPORT on automobile conditions in Sweden has recently been made by the French Chamber of Commerce there. In this it is pointed out that Sweden is a land of magnificent distances. The cities are far apart, especially in the northern section. It is a land of large, intensively exploited forests, of mines and iron works in remote places; the northern provinces, which are inaccessible by railway, offer a more fertile field for the sale of automobiles from year to year. In the southern districts, which are of more Continental appearance, and densely populated, automobiles are used in large numbers.

The Swedish road system comprises roads of an aggregate length of 40,000 miles. Country roads are narrow; during the winter period snow and mud make them anything but high-class automobile roads, and even in summer they are far from being in good condition. This is due in part to the scarcity of road paving material, and partly to the method used in building roads. Some blame, however, rests on the property owners, who are obligated to keep the roads in repair in proportion to the sizes of their premises. The roads are often crooked, because the ground is rough and not suitable for the construction of driveways, and wind in every manner around lakes and hills.

The numerous turns in the Swedish roads make an automobile tour in that country very fascinating, but they also make it impossible to achieve high rates of speed in automobile travel.

At the present time there are in use in Sweden approximately 70,000 motor cars. The predominant type is an open car of 15-20 hp. with four-cylinder motor. The demand is for durable types of car, and the chassis must neither be too wide nor too low. The spring suspension must be especially good; however, the majority of foreign cars are bought in the standard forms. The Swedes value particularly cars with elegant body work, and for this reason luxurious types of vehicles find the greatest market in that country.

The home industry is chiefly represented by Scania-Vabis, whose large works are located in Sodertalje, and which manufactures chiefly motor trucks, but also some passenger cars.

The following figures relate to the importation of automobiles in 1913, the last normal year before the war. The nominal value of a crown is 27 cents:

United States	285 cars, valued at	1,094,723 crowns
Germany	256 cars, valued at	1,254,732 crowns
England	76 cars, valued at	237,776 crowns
France	45 cars, valued at	258,077 crowns
Denmark	21 cars, valued at	880,960 crowns
Norway	7 cars, valued at	24,012 crowns
Italy	4 cars, valued at	25,287 crowns
Other countries	5 cars, valued at	15,085 crowns
Total		2,990,620 crowns

The Swedish duty on imported automobiles, with or without bodies, is equal to 15 per cent of the gross value, not counting freight charges. The duties on parts varies according to the weight and the material used in construction. For parts of steel the duty is 0.05-0.50 crowns per kilogram.

The following table shows the import figures for the first 10 months of 1919, and for the sake of comparison the figures for the first 10 months of 1918 are also given:

	1918	1919
January ..... Cr.	21,573	20,652
February	49,139	167,257
March	31,341	83,066
April	192,365	444,317
May	73,714	408,122
June	38,482	749,099
July	44,764	1,636,795
August	22,509	2,567,591
September	35,810	3,082,099
October	14,967	4,008,313

The total imports for the first 10 months of 1919 thus amount to $5,000,000, a very appreciable sum, which undoubtedly will come as a surprise to many manufacturers.

It is pointed out in the French Chamber of Commerce report that those cars which have been most successful in the winter contests of the Swedish Royal Automobile Club are in greatest demand.

American cars are in the lead, thanks to the efforts of Ford, and to the continued development of automobile design in the United States during the war. German cars are also very numerous, and previous to the war were very much favored. Fiat and Minerva occupy strong positions, which is to be ascribed to the energetic efforts of their representatives. French cars had a magnificent start, but in spite of the fact that they are known for their good quality and elegance, have lost much ground in late years.

In conclusion a few words are said regarding motor trucks, of which there are not a great many in use in Sweden. This is no doubt largely due to the condition of the roads as well as to the fact that these are too narrow to permit of one loaded truck passing another. For this reason the use of trucks is largely confined to the cities.

At the present time a movement is on foot to improve the road system in Sweden. The roads are to be widened and the bridges strengthened, and in spite of the slowness with which such a big undertaking can be carried through, it is to be hoped that these improvements will later serve to accelerate the introduction of motor cars.

As regards motor omnibuses, the conditions are about the same as above outlined. It is, however, noteworthy that the state railroads have inaugurated passenger transport on certain lines by means of omnibuses, and as the scope of this enterprise has constantly increased, considerable business may be expected from this source.

U. S. Army Training Courses for Automobile Mechanics

Several types of industrial training for automotive workers have been described recently in AUTOMOTIVE INDUSTRIES. Intensely practical work is being done along these lines by the U. S. Army. The following discussion of these army courses presents some excellent and interesting information.

By Harold F. Podhaski

THE two largest automotive technical schools in the world are located at Camp Hollabird, near Baltimore, Md., and at Camp Jesup, near Atlanta, Ga. Both are owned by the United States Government and operated under the direction of the War Department. The equipment at both these schools is worth many millions of dollars and the training is very thorough. The widespread interest of automotive manufacturers in the training of skilled workers makes interesting a description of the work done in one of these instruction camps.

The courses of instruction at both Camp Jesup and Camp Hollabird are virtually the same. There are twelve separate courses in the automotive field, the principal one being automobile mechanics. The others are ignition and carburetion, battery repair and rebuilding, chauffeur department, welding department, tire repair and rebuilding, blacksmithing and spring making, sheet metal and radiator work, woodworking and wheel building, painting, trimming and upholstery, warehousing and spare parts and automobile salvage.

Each of these courses is separate. Each man is thoroughly trained in the one course and no other, save those men taking automobile mechanics. This latter course includes training in several of the above subjects.

There is one instructor on the average for every six students. These instructors are civilians and recognized experts in their particular work.

The students at the training school are enlisted men of the army, most of whom are country lads who enlisted for no other purpose than to obtain this instruction. They may enlist for one or three years according to their status. Upon completion of their training course they are given a certificate or diploma of graduation, providing they are entitled to it; and the instructors and officials at the school feel that no man is entitled to this diploma unless he is really capable of filling a technical position in the automotive field upon his return to civil life.

When a man enlists in the army for one of these courses he is first examined by what is known as a classification board. His past experiences and his present desires are carefully considered by this board, which then decides what course he shall take.

Supposing an enlisted man is taking the automobile mechanical course, this course of training would be as follows:

He is first given what might be termed a sort of preliminary course before he is sent into production work at the shops.

Engine training is the first subject covered, several weeks being devoted to this preliminary work.

Tools, their use and abuse, care, arrangement, etc., and nomenclature of engine parts comprise the first subjects studied. Then follows the theory and operation of the four stroke cycle engine, the standard clearance of pistons, piston rings, piston pins, timing gears. Next are studied the use of precision instruments, including valve timing and setting, and then study of camshafts. Valve grinding is the next subject and then follow complete reviews of all the above work until the student is thoroughly familiar with the subjects he has learned—that is, as familiar as he possibly could be in the length of time devoted to these studies.

The next subjects taken up include the crankshaft, connecting rods, ball bearings, plain bearings, lubrication and the use of bearing scraper. The students do considerable work practicing scraping on salvaged bearings. Then follows bearing fitting and the use of shims, with next a complete review of this work.

Students are always assigned to these classes in groups not to exceed twelve so that the work under the various instructors in the preliminary training is almost individual. One-half of the preliminary work is devoted entirely to engine training and the other half to chassis training.

The men enter into actual production work as soon as they finish the preliminary training. The instructors work with the aid of charts and blackboards, and about $150,000 worth of machinery and other equipment is installed for this preliminary work alone. There are, for example, ten salvaged motor blocks which the students tear down and rebuild during their first training for practice; there are dozens of rebuilt chassis frames used in the same way, and hundreds of parts of every kind found in an automobile or motor truck. There are also a dozen complete engines from standard passenger cars and motor trucks with steering attachment, and the students work on these, tearing them down and rebuilding them as they learn. The instructors purposely cause engine trouble which the students are expected to remedy. Until a man is able to "shoot trouble" with some degree of success he is not entitled to leave the preliminary course for actual production work in the shops.

The most important part of the training course is taken up when the men enter the main shops for production work.

Every passenger car or motor truck brought into these shops is entirely rebuilt. This plant is not a service station in any sense but a complete manufacturing plant. A motor truck may be brought into the shop a dilapidated, demoralized wreck seemingly beyond redemption —most of them are like this, for they went through the

war—but when that truck leaves the plant it is virtually a new machine.

Men completing their preliminary course in engine training in the automobile mechanics course are then placed on engine production work in the main shops. Here they remain for several weeks and are given every available opportunity to work on as many different standard makes of engines as possible. Upon completion of this period they are again returned to preliminary chassis training, and completing this are returned to the shops where they are placed on chassis production.

The Government recognizes as standard the G. M. C. light delivery truck and ambulance, the one and one-half ton Garford, Packard and White, the three to five-ton Riker and Liberty, the latter designed for Government use during the war; and also recognizes as standard the Mack, F. W. D., Dodge, Cadillac and Ford. Students, therefore, taking this course of training, are thoroughly familiar with these standards in whatever department of the work they may be engaged.

When a truck or a passenger car is brought into the shops for rebuilding it is first taken to the assembly department. Men taking the automobile mechanics course receive instruction in this department also, and in chassis production and machine work, especially on engines. But those taking other courses specialize in that one department alone. There are men in the assembly department whose entire course includes assembly work. They tear down the cars or trucks as they come into the shops and rebuild them again when the various parts have come back from the other departments. When they leave this department—that is, after graduation and receipt of their diplomas—they are capable of holding positions in almost any assembly department of an automobile or motor truck plant, and especially those plants manufacturing the cars or trucks recognized as standard by the Government.

The instructors carefully study the students and their qualifications. Their ultimate receipt of a diploma of graduation depends upon the grades given them by their instructors during this period and through written examinations which are held at frequent intervals.

The instructors are very careful to select their men for training in that special work for which they seem best adapted. One man will generally show up better at one certain task than at some other and he is naturally selected, then, for training in that particular work. When the men first enter this machine department they work on a sort of experimental lathe. This is known as the Liberty lathe and there are twenty-eight of them at Camp Jesup.

When the men become proficient on these machines they are transferred to real production work and given that work the instructor feels they are best adapted for.

If a man is particularly ambitious and has done well in his course, he is allowed to take a post-graduate course if he so desires. Most of these chaps, as previously stated, are country boys, and they enlisted for no other purpose than to qualify themselves for their life's work. Therefore, quite a few of them take this post-graduate course and this makes them exceptional men in their particular line.

Following this post-graduate course the enlisted man is permitted to go still further if he desires, taking even a more advanced course, and some of the students take advantage of this as well. This includes a course at the Georgia School of Technology, which will turn a man out as a finished artisan, not necessarily equipped with the higher mathematics, but capable of working in association with engineers of the first class in his future career. In fact this final course offers the man every opportunity to make good on a big scale if he has the right sort of "stuff" in him.

At present there are 600 students taking the various courses at Camp Jesup, and they are completely rebuilding on an average of 100 cars and trucks every month. There are ample facilities for taking care of 1200 students, and capacity at the plant for completely rebuilding from 250 to 300 cars per month.

Because these men are being trained primarily for ultimate work in civil life, officials in charge of the army educational work have promised to inject into the courses more instruction from the commercial angle. That is, more attention will be paid to the costs of performing the various operations and the men will be taught to look at their work from this point of view, which will be essential later on when they go to work in civilian jobs.

Major Robert C. Eddy, Commanding Officer at Camp Jesup, Atlanta, Ga., will furnish any further information concerning graduates available for industrial positions, and will be glad to discuss in detail the special qualifications of any man upon request.

French-German Automobile Trade

TO judge by official reports of French imports and exports, the low value of the mark is helping the Germans in building up their foreign automobile trade. During the first four months of the current year the German automobile, motorcycle and bicycle exports to France amounted to 2,765,000 francs, but during the following four months the figure had grown to 8,438,000 francs. The imports of German passenger cars increased particularly rapidly, from 360,000 francs during the first four months, to 3,285,000 during the second four months.

As it says in Goethe's "Faust," a real German never likes a Frenchman, but good French wine he drinks and prizes high, so there can be no doubt of the Frenchman's dislike for the German, but at the same time he does not seem to disdain riding around in a Benz or Mercedes if the rate of exchange enables him to get one of these cars at a bargain figure.

However, the excess of automobile imports from Germany is probably one phase of the war indemnity payment. To be able to pay the indemnity, Germany has to sell her products abroad, and she would naturally look first to her chief creditors for a market.

The French exports of automobiles, motor trucks, motorcycles and bicycles to Germany during the first four months' period of 1920 were valued at 1,093,000 francs, and during the second four months' period at 2,800,000 francs.

TESTS made with different white metal bearing alloys by the Bureau of Standards showed that the tin base alloys maintain their properties better at elevated temperatures than those containing lead. Results of tests are given which indicate that up to 3 per cent the lead in a high grade babbitt does not affect the yield point or ultimate strength at 25 deg. or 75 deg. C. The yield point of tin base alloy is not affected by heating for six weeks at about 100 deg. C., but is lowered in the lead base alloy by heating for only two weeks at this temperature.

Teachers Interested in Motor Transport Education Plan

Joint Conference at Pittsburgh develops many points of mutual interest and profit. Improvement of rural school system closely linked with the development of highways and highway transport. Committee definitely provides for mechanical and highway engineering courses.

REPRESENTATIVES of the automotive industry, national and state highway departments and the foremost educators of the country concur in the opinion that the outstanding and immediate effect of the first joint conference of the Permanent Highway and Highway Transport Education Committee with a group of school teachers will be the recognition of the interdependence existing between the development of rural life and good highways.

The ultimate effect of this initial meeting will be the employment of the talents and interest of school teachers and pupils in promoting the public interest which is essential for the support of the development of highway transport and engineering.

The meeting, held at the University of Pittsburgh Nov. 26, marked the inauguration of a nation-wide movement having as a prime purpose the stimulation of interest in the great problems affecting extension and improvement of highways and highways transport. There is a unanimity of opinion on the part of all interested in this work, which is admittedly in a pioneer stage, that nothing would render the program more insecure than neglect of the citizens of to-morrow.

The conference went on record as being in favor of adapting school studies to conform with the new subject in order to inculcate in the minds of the growing generation the essentiality of highway transport to the advancement of civilization.

This position is easily tenable, for it is an established fact that the impressions in youth invariably influence reflections of mature citizens. It is assumed that whatever prejudices are imprinted on the adolescent mind, such as a misunderstanding, either unconsciously or wilfully, of influences of highways on local affairs could seldom, if ever, be eradicated. Because education inevitably tends to alter judgment and manners, the leaders in this movement believe that the best results will be obtained by placing all available and authentic information regarding the problem at the disposal of school teachers generally.

The conferees realized that their efforts would fall short of the goal unless a uniform method of teaching could be devised. Failure to obtain uniformity in teaching the fundamentals of this new and vital phase of education would obviously involve undue and hazardous complications. The entire system would naturally be menaced through a multitude of conflicting ideas. With this thought in mind, the representatives of the National Automobile Chamber of Commerce, United States Bureau of Education, Bureau of Public Roads, farm organizations and other co-operating agencies made their plans. They made clear the fact that there is no greater need for the success of the endeavor than that of providing a working knowledge of the problem to the school teachers.

The Pittsburgh conference, therefore, served its purpose admirably. It established a contact between the promoters of the plan and 1500 instructors in Pennsylvania schools, whose assistance must be enlisted to put over the new subject, which is regarded indispensable to progress. In the strictest sense, the Pittsburgh meeting was not local or confined to the State; it is confidently expected that its influences will spread to other States, for the meeting was called primarily to initiate the actual movement under conditions which would inspire other States to take up the work along the same progressive lines. **The enthusiasm which accompanied the presentation of this new subject to a large and representative group of educators augured well for the extension of the campaign.**

Experience has made known the opposition of many farmers to expenditures for good roads. Automobile manufacturers and dealers know full well that sales are few and difficult where roads are inadequate for motor traffic. Just how the automotive industry and the farmer may be mutually helpful was brought out by various speakers at the Pittsburgh meeting.

As Commissioner Claxton of the Bureau of Education and chairman of the Permanent Committee on Highways and Highway Transport Education, aptly declared, "There is a need for economic adjustment between this means of transportation and that of railways and waterways. You must have a high degree of general education before this thing can come."

Roy D. Chapin, president, Hudson Motor Car Co., and a member of the Permanent Committee, told of the importance of highways in city planning. He was of the opinion that highway transport would influence city extension designs and outlays more than any other single item. Reference was made to the condition existing in Detroit, where the broad streets do not measure up to the increasing volume of motor traffic.

Chapin impressed his hearers with the necessity of city planners including a study of highway transport and related problems before committing themselves to any plan.

Advocates of good roads and greater sales of motor vehicles, which are incident to this development, have found it no mean task to arouse the interest of the farmer in the movement for better highways. Educators and spokesmen for the automotive trade agree that the campaign for consolidation of rural schools and development of community center and church attendance offers a way out. The farmer almost invariably opposes propositions which may mean heavier taxes. The small district school is no longer regarded as practical because its educational facilities are necessarily restricted. The consolidated rural schools, with more teachers and greater opportunities for education through use of more and better equipment, are recommended by educators. But, the consolidated

school is manifestly interwoven with the extension of highway transport and highways. These schools, which would abolish the isolated district school, require the use of vehicles in order that the pupils could reach the schools in time. The motor bus has proved effective and inexpensive. At present there are 280,000 rural school houses in the country. The program of consolidation calls for a reduction of this total to 70,000. Educators supporting the consolidated movement maintain that farmers must support the good roads movement, as well as the combined school house plan. Thus, the advocates of economy through fewer schools, must necessarily lend their assistance to the highway program.

The connection between these two schemes was illustrated by Superintendent of Schools Armstrong of Venango County, Pa., in the statement that the road program and rural school program are identical. He believes, and he said that he voiced the sentiment of other educators, that poor roads delay consolidation of schools. If first-class highways are built immediately, it will ultimately reduce the cost of school building. Good roads and the consequent benefits accruing from increased use of motor vehicles would eliminate expenses of secondary buildings. It is this economy feature of the situation that is expected to exercise its greatest influence on the farmer. As expressed by Armstrong: "Pennsylvania is behind the program which is for making better schools through better roads."

How broadening and effective is the influence of good roads and better methods of highway transportation was emphasized by Chancellor McCormack of the University of Pittsburgh, who told the conferees that development of this form of transportation removed the country from the dominion of labor organizations and other groups which interfered with the arteries of commerce to gain their selfish ends.

Thomas H. MacDonald, chief of the Bureau of Public Roads, pointed out that the highway engineers were doing their best to build roads better than the public in general thinks is required. The engineer looks forward to the increase in motor vehicle traffic and makes his plans accordingly.

The phase relating to safety methods, as explained by Miss Harriet Beard of the Detroit Board of Education, impressed the instructors with the necessity of presenting these subjects to their charges. Commissioner Claxton stirred them to a realization of their duty to spread the gospel of progress through support of the highway educational movement.

The meeting, in many ways, brought out the important part teachers must play in extension of highway education.

Mr. Chapin cited the importance of the automobiles and highways to problems of the day. His quotation from a statement by Herbert Hoover that fully 50 per cent of farm products fail to reach markets because of the lack of transportation facilities, was widely mentioned in conferences of educators, particularly groups from the rural districts.

Recommendations of three major committees expressed the views of the conferees on the best methods for furthering the movement. The Vocational Committee discussed the training of foremen, road supervisors and other officials connected with construction and maintenance of highways. They considered the question of training for chauffeurs, auto mechanics with special relation to the efficient operation of machines on the highway. The conference accepted their suggestions that a sum of money should be set aside for the preparation of an actual course of instruction which should be compiled by competent educators working in close co-operation with recognized experts in the occupations for which the training is to be provided. It was urged that automobile factories, garages and other places where the men interested in these matters are employed, should arrange for part time and evening classes to meet the needs of workers.

The Highway Transport Committee's report, which was accepted by the conference, recommended that universities and colleges offer a required three-hour course of one year in highway transport and highway engineering as a part of their civil engineering courses and that not more than ten universities, located in different geographical sections of the country, should offer short period advanced courses covering various phases of highway transport and highway engineering.

The message of joint committee will be carried to the school children through revisions in textbooks. School officials throughout the country will be requested to revise textbooks on economics and civics particularly with a view of including chapters on highway transport.

Perhaps the most effective means of placing this matter before school authorities is provided for in the recommendation to the United States Bureau of Education that booklets explaining the advantages of this field should be published and distributed. With this co-operation practically assured by Government officials, stimulated interest should result.

State departments of education will be asked to form courses under the subject of safety first rules and to especially require a more strict enforcement than at present. The Legislatures in States where there are no laws requiring safety first course, will be petitioned to pass such measures.

Because of the prosecution of automobile owners in certain cities without regard to pedestrian offenses it is significant to note that the conference earnestly recommended the enactment of such legislation as will permit the regulation of pedestrian traffic by vesting a degree of responsibility of conduct in the pedestrian. It was also urged that municipalities be empowered to adopt ordinances requiring pedestrians to use designated crossings exclusively.

The next meeting of the Permanent Committee is scheduled for February. An invitation of the University of Michigan was tentatively accepted.

Accurate Measurement of Interior Diameter of Ring Gages

A METHOD for measuring the inside diameter of plain ring gages has been developed by the Bureau of Standards during the past month. The method is a very simple one and employs two steel balls the sum of whose diameters is slightly larger than the nominal inside diameter of the ring to be measured. The ring is laid on a surface plate and the larger ball placed in the ring, the smaller one then rests against the inside of the ring and on the larger ball. The difference in vertical position between the upper surfaces of the two balls is determined by means of a micrometer attachment. This dimension is easily converted into the vertical distance between the centers of the two balls. The value thus obtained forms one side of a right-angle triangle whose hypotenuse is the line joining the centers of the two balls and whose base it is desired to determine. Knowing the vertical side and the hypotenuse, it is possible to calculate the length of the base, which added to the radii of the two balls gives the inside diameter of the ring. The method permits an accurate determination of the contact pressure and can be and has already been used on extremely small holes. A greater accuracy can be obtained by this method than by any other used up to this time.

Pulitzer Trophy Air Race Supplies Engineering Data

Five smaller powered machines, which closely contested with the Verville Packard racer, are the subject of much interest on part of engine and plane designers. Performance of American entrants makes it apparent that this country maintains its leadership in aircraft development.

By W. D. Richardson

FROM a spectacular viewpoint, the achievement of the Verville Packard in breaking the world's airplane record for speed over a closed racing circuit was the outstanding feature of the Pulitzer Trophy Race held under the auspices of the Aero Club of America at Mitchel Field, Long Island, on Thanksgiving Day.

Piloted by Capt. C. C. Mosley of the Army Air Service, this winged monster, equipped with its enormous 600 horsepower Packard motor, negotiated the 132-mile course in 44:29:57, eight miles an hour faster than the world's speed record hung up by Sadi Lecointe, the Frenchman, in his Nieuport Special during the Gordon Bennett aviation races held in France last September.

Less sensational but of equal, if not even greater, importance to aviation progress were several other features:

Foremost of all, the demonstration of aviation's safety and certainty. Out of thirty-five machines that passed the first pylon all but eleven completed the three laps of the triangular course—Mitchel Field to Lufberry Field, near Wantagh, to Henry J. Damm Field, at Babylon, and return. It was a remarkable performance, one that should inspire confidence, indicating that airplane manufacturers have succeeded in designing and building motors that are reasonably reliable and dependable even under the stress and strain of race conditions.

Second was the unmistakable demonstration of public interest in aviation. Thirty thousand persons, estimated, made the journey to the army aviation center to witness the race, two special trains coming from New York.

Third, the proof that America, instead of lagging behind the other governments of the world in aviation, as is popularly believed, is really ahead of them in the way of successful designs. Seven distinct and comparatively new types of American machines were represented in the race and in practically every case the machines not only lived up to estimated performance but actually exceeded the marks made by them in previous trials.

Fourth, the race itself undoubtedly produced some performance and engineering data that will be useful in future design and construction.

It was a foregone conclusion that unless the same difficulty that caused its ignominious failure in the Gordon Bennett races, i.e., lack of sufficient radiation resulting in an over-heating of its motor, presented itself, the Verville Packard would outstrip the field. With its 600 hp. motor, it was far more powerful than anything entered in the race. Furthermore, it was essentially a racing design while its competitors were all machines designed and built for service. Its only competitors with even the slightest chance of winning were the Thomas Morse with a 300 hp. Wright (Hispano) motor, the Loening Special monoplane with a 300 hp. Wright (Hispano) motor, and the Curtiss-Kirkham triplanes with their 400 hp. Kirkham motors.

Other American machines entered were the Vought V. E. 7 with the 180 hp. Wright (Hispano) motor, the Ordnance Engineering Company's Orenco with the 300 hp. Wright (Hispano) motor, and the De Haviland with the Liberty 400 hp. motor.

Foreign representatives were the British S. E. 5 with the 180 hp. Wright (Hispano) motor, and the Sopwith Dolphin with the 300 hp. Wright (Hispano) motor, the Italian Ansaldo S. V. A. with the 200 hp. SPA motor, and the French Morane Saulnier with the Le Rhone 110 hp. motor. A German Fokker with a 300 hp. Packard motor was entered but came to grief en route and could not be made ready in time to enter.

Outside of the performance of the Verville Packard, which was expected, the performance of five machines—the Thomas Morse, the Loening, the Vought, the Orenco and the Ansaldo S. V. A. furnished surprise and useful data.

Of these, from the standpoint of speed and consistency, the Thomas Morse proved its claim as being one of the fastest service machines in the world today. Not only fast but, more important than either, consistent and reliable. Here was a machine designed for 150 miles an hour, a mark which is bettered by 18½ miles an hour in the race. Two days later, in a speed trial over a measured course in order to beat the record of 192 miles an hour made by Capt. Bernard Romanet, the French pilot in a Spad, the Thomas Morse attained a speed of 171.25 miles an hour; whereas the Verville Packard bettered its average speed made on Thanksgiving Day by only eight miles an hour.

The Ansaldo S. V. A. was the only foreign representative to finish inside the first ten places and its performance in winning third place in a field of machines with double and treble its power speaks well for the efficiency of its design and motor. This machine—a stock machine which is now seeking a place in the commercial aviation world—completed the course in 51:57:62, less than seven and one-half minutes behind the Verville Packard and less than five minutes behind the Thomas Morse.

The Orenco, manufactured by the Ordnance Engineering Corporation and piloted by Capt. St. Clair Street, commander of the recent Alaskan expedition, finished in fourth place with an average speed of 151 miles per hour, furnishing another surprise.

Fifth place was won by a Vought V. E. 7 and, considering the fact that it was designed essentially as a primary training plane and that it was equipped with a Wright motor of only 180 hp., its performance in defeating the seventeen De Havilands is a considerable tribute to its designer. Its elapsed time was 55:39:19, or an average speed of 143.3 miles per hour.

The failure of either of the two Curtiss-Kirkham triplanes was a considerable disappointment to navy representatives. One of them, the same machine in which Roland Rohlfs set a world's altitude record and a world's climbing record and credited with a speed of 165 miles per hour, was confidently expected to outstrip the field with the possible exception of the Verville. It negotiated two laps in fast time and then developed motor trouble; while the second machine, after considerable difficulty in getting started, made a short flight and returned to the field.

The race marked the first public appearance in America of two new types—one represented by the Verville Packard and the other by the Loening Special, a monoplane with a wing-spread of only 29 feet. The latter was the only machine to present any strikingly new features—a wing with a negative dihedral angle, the first time that this innovation in construction had ever been flown. For two laps this little machine, with a 300 hp. Wright motor, sped around the course on even terms with the Thomas Morse but on the third lap, one mile from the finishing point, a water connection broke and Lieut. Bradley of the Navy, who was acting as pilot, was compelled to drop out of the race.

The value of racing has always been a mooted question. There is no gainsaying the fact, however, that in the automobile world, especially, a great many improvements have been the result of discoveries made during race contests. There are few who will deny that the scientific data obtained more than justifies the ends. So in aviation. Tremendous speed is not by any means the most important thing in aeronautical progress but it is of more significance than is apparent on the surface. In aviation, it is an established fact that increasing speed has been accompanied by increase in reliability and, after all is said, increased reliability is the one factor that is going to popularize commercial aviation. Speed in aviation means cutting down of air resistance, increasing the efficiency or lifting and propelling surfaces, increase in motor power, or advance in adaptation of the engine to the airplane—one or all. There is no question but what the aviation experts of the country, most of whom were present at the race, gained a great many new ideas and that these ideas will eventually be transmitted to the commercial aspects of aviation.

There is another important point in connection with the Thanksgiving Day races. This relates to public interest. More persons attended the meet than would have journeyed out to Long Island to see a great aerial liner embark on a non-stop, cargo and passenger carrying trip to San Francisco. The love of the spectacular is far greater than the appreciation of something of more value commercially. The absence of accidents of any serious nature will be reassuring to the public at large, many of whom will regard the airplane in the light of a dangerous toy. The Thanksgiving Day race will do more to counteract the omnipresent fear of the air than any other similar event possibly could. The race represented an aggregate of twenty-four hours flying by several types of machines and motors over an average course without a single mishap. It brought aviation before the public eye and its effect will undoubtedly make itself felt in governmental recognition.

A technical question was raised by the comparative performances of the Verville Packard and the Thomas Morse. Here were two machines, one having double the motor power of the other, and yet in a 132-mile flight, the Thomas Morse's elapsed time was within two and one-half minutes of the Verville. It naturally raises the question: At what point does power as applied to the airplane, cease to aid in efficiency? We had motors of 300 hp. and less making a comparatively better showing than those of 400 and 600 hp. Of course, there is much that can be said in extenuation of the Packard 600; it was and is still an experimental motor. In France, the difficulties encountered by Major Schroeder lay in its inadequate system of radiation—the same difficulty that presented itself in connection with the development of the Curtiss Twelve, a modification of the Kirkham Twelve. In the Pulitzer trophy race, the same difficulty was encountered although in a lesser degree. However, instead of turning up 1900 r.p.m., as it is supposed to, the best that Capt. Mosley could get was 1700. As a result of the trouble encountered, the machine will be sent to McCook Field and tested with a low compression motor.

After all is said and done, however, it is generally admitted that the trend of motor development will not be along lines of increased power but along opposite lines. The Verville indicates clearly the difficulties encountered in adapting a design to a large motor. As a result, it is a rather ungainly-looking craft—huge and cumbersome. The demand for speed will be better met by smaller motors and more efficient design. The demands for commercial purposes by more economical motors, less temperamental motors.

Taken as a whole, the race gave an unmistakable impetus to aviation and has probably become a fixture in the world of aeronautics.

Summary of the Pulitzer Trophy Airplane Race

Place	Type		Motor			Pilot	Entered By	Elapsed Time	M.P.H.
1.	Verville Pack'd	(Am.)	Packard	600 hp.	(Am.)	Capt. C. C. Mosley	U.S.A.	44:29:57	178
2.	Thomas Morse	(Am.)	Wright	300 hp.	(Am.)	Capt. H. E. Hartney	U.S.A.	47:00:03	168.5
3.	Ansaldo S.V.A.	(It.)	SPA	200 hp.	(It.)	Albert Acosta	Aero Import Co.	51:57:62	154
4.	Orenco	(Am.)	Wright	300 hp.	(Am.)	Capt. St. Clair Street	U.S.A.	52:27:02	151
5.	Vought V.E. 7	(Am.)	Wright	180 hp.	(Am.)	Lt. A. Laverents	U.S.N.	55:39:19	143.3
6.	De Haviland	(Am.)	Liberty	400 hp.	(Am.)	Lt. J. P. Roullot	U.S.A.	56:06:58	141.5
7.	De Haviland	(Am.)	Liberty	400 hp.	(Am.)	Lt. Carl Eliason	U.S.A.	56:09:39	141.4
8.	De Haviland	(Am.)	Liberty	400 hp.	(Am.)	Lt. J. B. Wright	U.S.A.	56:52:20	140.3
9.	De Haviland	(Am.)	Liberty	400 hp.	(Am.)	Lt. Charles Cummings	U.S.A.	57:08:12	140
10.	De Haviland	(Am.)	Liberty	400 hp.	(Am.)	Lt. D. L. Conly	U.S.N.	57:40:76	139.5
11.	De Haviland	(Am.)	Liberty	400 hp.	(Am.)	Capt. H. N. Heisen	U.S.A.	58:15:28	....
12.	De Haviland	(Am.)	Liberty	400 hp.	(Am.)	Lt. V. C. Finch	U.S.N.	58:32:04	....
13.	S.E. 5	(Br.)	Wright	180 hp.	(Am.)	Capt. Maxwell Kirby	U.S.A.	59:42:67	....
14.	De Haviland	(Am.)	Liberty	400 hp.	(Am.)	Lt. Lawrence Claude	U.S.A.	59:56:53	....
15.	Vought V.E. 7	(Am.)	Wright	180 hp.	(Am.)	Lt. W. B. Gwyn	U.S.N.	59:59:38	....
16.	Vought V.E. 7	(Am.)	Wright	180 hp.	(Am.)	Lt. L. H. Sanderson	U.S.N.	60:09:38	....
17.	De Haviland	(Am.)	Liberty	400 hp.	(Am.)	Lt. W. R. Lawson	U.S.A.	60:48:46	....
18.	De Haviland	(Am.)	Liberty	400 hp.	(Am.)	Capt. H. B. Mims	U.S.N.	60:49:34	....
19.	De Haviland	(Am.)	Liberty	400 hp.	(Am.)	Lt. L. F. Bean	U.S.A.	61:01:62	....
20.	Vought V.E. 7	(Am.)	Wright	180 hp.	(Am.)	Lt. R. W. Brown	U.S.A.	61:35:28	....
21.	De Haviland	(Am.)	Liberty	400 hp.	(Am.)	Lt. R. C. Moffat	U.S.A.	61:47:45	....
22.	Vought V.E. 7	(Am.)	Wright	180 hp.	(Am.)	Sgt. J. H. Dunn	U.S.N.	61:50:38	....
23.	De Haviland	(Am.)	Liberty	400 hp.	(Am.)	Capt. Norbert Carolin	U.S.A.	62:40:22	....
24.	Morane Saulnier	(Fr.)	Le Rhone	110 hp.	(Fr.)	Charles Colt	Morane Saulnier Co.	63:16:33	....

Modern Industry Must Recognize Moral Obligations

The units of modern economic organization are interdependent. This interdependence arises through the ability to deal in futures; we could not go on were it not for the constant production for future use. The whole industrial structure rests upon the mutual honoring of contracts.

By Harry Tipper

A FRIEND of mine who is rather active in his work of labor organizations and who follows the trend of business considerations pretty thoroughly, started an argument with me the other day on the question of the union. He is thoroughly acquainted with the fact that I have no faith in the ability of the union and the manufacturer's group, as organized at present, to provide the basis of industrial peace. So he is not averse to drawing my attention to things which might be of advantage to the union side, or at any rate have no tendency to weaken their condition.

His argument started something like this: You have been rubbing it into me pretty hard about the inability of the labor leaders to secure the fulfillment of a contract made between the union and the manufacturers and you have considered this one of the great weaknesses of labor.

I have been obliged to admit that it was true to some extent, but I maintained that it was not true in a good many cases, and that the union lived up to its agreements at least as well as the manufacturer.

Now what's happening? Prices begin to slump and contracts are cancelled between manufacturers without any regard to the obligation of the contract. With all your knowledge of the union, it will be pretty hard for you to find evidence of as many broken contracts by the unions as you can find in the last four months between manufacturers, on the contracts they have made with each other.

It was a pretty hard statement to answer, because the cancellation of contracts in some lines of an industry in the last few months has become notorious and has involved all sections of that industry.

It was not much use in pointing out to my friend that this thing had not happened before between manufacturers. There was very little use in pointing out to him the necessity for contractual obligations in the running of modern industry.

The only ground upon which I could take any firm position, was the ground that the failure of another man to recognize his moral obligation, did not justify the failure of the labor leader or the worker in the same thing. An argument based upon that point carries comparatively little weight, however, with the practical man in modern industry, and I don't believe it made much of an impression upon the gentleman with whom I was speaking.

It is unfortunate that the exhibition of the disregard of the contract between manufacturers should have been sufficiently widespread at this time to justify in their own minds, or at least excuse to the labor leaders and the union officials, their own actions in the breaking of contracts when it was to their own advantage to do so. After all, however, the disturbance lies very much deeper and is likely to have a very much more important effect upon the future of American industry.

In these articles the complete interdependence of the modern economic organization has been stressed a good many times. The reason for its emphasis is the general lack of comprehension regarding this interdependence and what it means.

This interdependence has grown up through the ability to work in futures, and the modern organization would be impossible if it were not for the constant production of fabricated products intended for future use or consumption.

A very large part of the operations in modern industry concern themselves entirely with the production of material, equipment, machinery and so forth, which is needed in order to provide production for next year, the year following or twenty years from now.

The basis of this whole speculation upon the future and the stable foundation of its operation has been the contract which obligated one man to take from another a certain portion of the product he was making for a given length of time in the future, and under conditions of future manufacture, it would enable him to plan his work and continue with his organization. Anything which interferes with the stability of this future production slows down the whole machinery and tends to reduce its efficiency and the ease with which the investment may be made in its progress.

It takes away from between men the only obligation which permits of continuous operation of full power organization and investment put to the maximum capacity. The deterioration of it removes the only piece of service between men which can permit the development of organization to a reasonable point of efficient co-operation.

It is intimately concerned with the relations between employer and employee as there can be little development of co-operation between these unless the moral obligation of the contract is reasonably observed.

Convulsions in business are likely to be more severe and the changes more violent where the future cannot be depended upon through the regular instrument of its operation—the contract.

Some time ago in one of these articles it was pointed

out that the mutuality of the contract was its most important feature and that in the growth of modern industry this mutual obligation in respect of contract had been practically destroyed in the relation between employer and employee.

It is this general deterioration in the mutuality of obligation in contractual arrangements that has lead to the renunciation of contracts by many manufacturers between each other, when there was no advantage to the individual concern in the observance thereof.

This condition is dangerous because the interdependence of modern industry is so complete and so delicate that anything which breeds suspicion reduces confidence and requires extraordinary measures of protection, disturbs that delicate balance and reduces the volume and efficiency of industry's operation.

The needs of a growing population do not grow less in actual fact, but their disposition to supply those needs varies in accordance with their confidence in the fairness characterizing those with whom they must deal, their confidence in the future stability of their own operations, and the future stability of the operations of other industrial departments.

It is not wise for me to steal from my partner or to put him in the hole for a fancied temporary protection when I depend upon him for a part of my life necessities and cannot escape that dependence. Every manufacturer, every worker, is dependent for his own well-being to such a large extent upon the well-being of the rest of the community that all matters which affect the confidence, the trust and the stability of future operations should be considered with great care and not lightly disposed of.

The deep suspicion with which the worker regards the policies and actions of employers in a general way is due very largely to the gradual destruction of the mutuality of obligation between the two in their relations with one another.

The suspicion with which the public has regarded the recent price development and their determination to withhold buying, has been due, very largely, to the suspicion that they were not being fairly dealt with and that the mutuality of obligation was not being observed.

The cancellation of contracts which followed the slackening of buying has served only to increase this suspicion so that manufacturing establishments are no longer able to depend with confidence upon their future relations with their customers on the basis of the expressed obligation. This is not likely to decrease the unrest and it is detrimental to the efficiency and the volume of production not only for the time being, but for a good many years after the circumstances which brought it about.

It is easy to create suspicion; it is difficult indeed to remove it. The circumstances which create it may be temporary, but the suspicion itself is likely to last and to be removed with difficulty. Nothing is so important to the growth of modern industry and its peaceful progress as the clear understanding of the mutual responsibility and the careful consideration of the practical instrument of that responsibility upon which the future operations of industry largely depend.

Making the Punch Press Safe and Efficient

(*Continued from page* 1120)

ment enters in many ways other than the one of safety.

The safety man in beginning his work has several persons whose co-operation he must gain and to whom he must "sell" his idea. The management may look askance at his efforts because, as noted previously, punch press safety work has in the past usually meant reduced production. Results are a convincing argument in this case.

The foreman and the operator must be sold on the plan. The foreman will also be afraid of reduced production and consequent poor showing which his department might make.

The operator, while desiring safety, will not wish to have his earnings reduced. In this regard, the work can best be accomplished by maintaining piece rates at their set level and allowing the operator to benefit along with the management by improvements made in the operation.

While the work done by Mr. Kaems has in practically every case resulted in a production increase, he does not believe the human element should be sacrificed to production.

"If production is more important than hands and fingers," Mr. Kaems says, "industry is on the wrong track. Piece rates on punch presses should be set so that a man is able to earn his fair wage without risking injury; that is, the press should be made as efficient as is consistent with safety, and piece rates should be set upon that basis."

Practical Benefits of Body Standardization

(*Continued from page* 1124)

platform. Instead, braces of one sort or another must be used and these are usually objected to on the grounds that this construction is not as strong.

To recapitulate: In order to make it possible to build truck bodies completely and have them fit all chassis it is necessary to standardize the following dimensions:

1. Distance from rear of driver's seat to rear wheel centers.
2. Width of chassis frame.
3. Width of chassis frame flanges.
4. Difference in height between top of frame and top of wheels; or better yet, standardization of wheel diameters, and frame height from the ground.

If it is not feasible to standardize the distance from rear of driver's seat to rear wheel centers by the use of a single dimension for each truck capacity, then three or four dimensions should be so selected that the rear wheels would always come between two cross-pieces, and never over one of them. This assumes that cross-piece spacing would also be standardized, a thing that is both feasible and desirable.

Standardization of frame widths would make shifting of the stringers unnecessary.

Standardization of chassis frame flanges would permit a flush fit between the stringer sides and the frame. As it is now it is necessary to have stringers of several different widths to fit frames with different flanges.

Standardization of the clearance between wheel and platform would greatly simplify the fitting of the platform to the chassis. It would also make it quite feasible to build camelback (sloping) platforms on a production basis, a thing that is all but impossible now because of the varying truck dimensions.

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

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Publicity That Detracts

MOTION pictures are being utilized extensively by automotive manufacturers for publicity purposes. Sometimes pictures of the plant are featured, sometimes the product is shown in use, and sometimes particular achievements of the product form the basis of the pictures. In every case the captions play an important part.

Many of these captions exhibit the same glaring fault which renders ineffective so much publicity of other kinds. The name of the organization or product appears frequently and in large letters; exaggerated statements are made in its behalf and often good photography is entirely offset by absurd captions.

Whether exhibited by dealers or to dealers, this sort of thing is even less effective in motion pictures than elsewhere—if such a thing is possible. The public is accustomed to high grade motion pictures, with entertaining, if not always intelligent, captions. It will be interested in nothing less. The elimination of crude publicity statements from the captions of such pictures will do much to increase both their popularity and effectiveness.

Forestalling Complaints by Intelligent Fuel Saving

MANY car manufacturers are aiming to decrease the fuel consumption of new models, but the average car already out continues to waste fuel unless its owner happens to be sufficiently interested in getting better fuel economy to insist upon having desirable adjustments or changes made. The service station, especially if its policy is directed by the car manufacturer, seldom suggests a change in equipment and too frequently is not particular about carbureter adjustment so long as the car performs reasonably well. It is a well-known fact among engineers that most engines pick up more quickly and handle a trifle more smoothly on an over-rich mixture. This is an easy adjustment to make and the one usually made. Yet many owners would gladly sacrifice a trifle in performances to secure lower fuel consumption if they understood the benefit to be derived. After all, the difference in performance as between the car with a slightly lean and an over-rich mixture is small, especially when manifold conditions are right, while the saving in fuel may amount to 20 per cent or more, and other advantages are gained.

Frequently, however, the manifold is too large or the heating of the charge inadequate, so that no really economical adjustment is possible. In such a case an up-to-date manifold of proper bore and with adequate heating might well be supplied by the car manufacturer at reasonable cost. This would go far toward keeping satisfied customers.

Poor carburetion and manifolding give rise to many difficulties which are both annoying and expensive for the user. These include rapid accumulation of carbon deposits with consequent tendency to knocking, poor lubrication due to dilution of crankcase lubricant by unburned fuel, and tendency to loading with consequent irregular running. Would it not pay to correct these difficulties at the source rather than allow them to be a constant cause of trouble? Fuel promises to become less and less volatile, and consequent service problems are more and more aggravating. Why not frankly recognize the fact that most cars a few years old can be greatly improved by rendering intelligent service, offer this service at moderate expense and thus solve or forestall many complaints?

The Moral Side of Contracts

WE invite a careful reading of the following statement by H. F. Barker, Chairman of the Committee of Credit Co-operation and Credit Methods of the National Association of Credit Men. This statement, evidently, was made public after much consideration on the part of Mr. Barker. It follows:

> "A careful survey of the cancellation practice reveals a more serious situation than was at first

believed. The indefinite holding up of orders for later instructions has been a most potent factor in the slowing up of business. A surprising lack of moral fiber has been revealed.

"Proper value has not been placed on the purchase agreement. We have indulged in loose practices and nothing has given us a clearer insight into this unfortunate thing than the cancellations of recent months. When the market was in the sellers' hands questionable practices were frequently resorted to, which in effect are just as serious and deserving of condemnation as cancellations. Purchase agreements were often neglected when the commodities could be sold at higher prices. Not placing, therefore, the sole responsibility on the buyer, when conditions were reversed and the market came to his hands, yet there has resulted from the lack of good faith in the treatment of orders a damage to business which we have endeavored in a general way to estimate at $250,000,000.

"It is but just to say that this is a spiritual problem, and the world in recent years has been dealing with spiritual things, but in a materialistic manner. We must inject more religion into business!"

Religion, we take it, is a very broad word as used by Mr. Barker.

Tire Temperature and Pressure

A GREAT many varying claims have beeen made regarding the increase in tire temperature and the corresponding increase in pressure due to high road speeds or high atmospheric temperature. The question has become particularly pertinent in connection with giant pneumatic tires used on trucks. With these large tires, which are of relatively heavy section, it is planned to operate trucks at sustained high speeds over fair to medium roads. The life of a tire of course is very intimately associated with the temperature at which it runs, and practically all of the tire company laboratories at present are endeavoring to produce a tire that will generate the least amount of heat, and upon which heat will have the least effect.

All tires, when carrying a load, have local distortion at the point of road contact. The area of contact surface, in square inches, multiplied by the air pressure, balances the load, providing the tire offers no resistance to flexing. But this balance of forces is affected by the frictional resistance of the carcass to bending and tractive stresses. These factors vary in amount, depending on construction and design of the tire, and give rise to the generation of heat.

The Grant tire, by reason of the greater air pressure carried, and the greater tractive stresses it must withstand, requires a stronger carcass of larger cross-section, than is used in smaller tires. The resulting action between the greater number of cord layers and greater bulk of material necessary tends to generate heat more readily and retain it longer than the thinner carcass tire used in automobile service, particularly if the tires are used with low inflation pressure or with over-loads at standard pressures.

With low inflation pressure, a tire is deformed until the greater supporting area at the road contact times the lower pressure balances the load. This distortion causes excessive bending action and displacement of the tire carcass, and promotes rapid generation of heat. The same is true with overloads when applied to the tire at standard inflation pressure, since the tire is similarly distorted.

Excessive speed is a dangerous factor that must also be considered in the abnormal heating possible in tire service. Overloading and over-speeding, either singly or in combination, constitute an abuse and promote a more rapid failure of the tire. Hence it is important that in selecting pneumatic tires of proper capacity for truck use due consideration be given to both the inflation pressure and the speed, for both of these factors are as important as loading, in respect to their effect on tire life.

The relation of pressure increase to temperature increase is practically in accordance with Boyle's Law, as we may consider the volume a constant. That is, absolute pressure varies as absolute temperature.

As an example, assume that a tire with an initial pressure of 120 lb. at 70 deg. Fahr. attains a maximum temperature of 140 deg. The resultant or final pressure, according to this law, would be approximately 136 lb., or an increase of 16 lb. per sq. in. This increase of pressure certainly cannot be considered dangerous, as the construction of the tire provides a safety factor of three or four. Heating of tires is not, therefore, dangerous because of the rise in pressure resulting, but because it indicates frictional and abrasive action in flexing which result in rapid deterioration.

The Responsibility of Power

THE movement of industry is slowly but certainly in the direction of a more complete development of the individual. Many barriers in the form of monotony work, blind-alley occupations, etc., operate to hinder that movement, but the fundamental forces underlying our modern civilization carry it forward. Its first crude manifestations became evident when political autocracy was first threatened; its later voice is heard, speaking, it is true, in a confused tongue, in the current demands of labor for a larger share in the determination of industry's progress.

But under any circumstances, short of actual socialism, the modern business executive must hold a great potential power over the lives of the army of employees in his organization. To administer that power wisely, so that the development of his business will coincide with the development of the various individuals in the organization, to mold his business policies along the lines of sound human progress—this means personal benefit together with social service.

"What a wonderful opportunity an executive in a big business institution has to influence the lives of thousands of men and women!" says Thomas Dreier. "Few professional preachers have as great an opportunity. The great executive is more powerful than kings. From him goes forth an influence which manifests itself in thousands of homes. A business builder to-day must also be a man builder."

du Pont Elected G.M.C. President

Durant to Retain Place as Director

Inauguration of Conservative Policy Seen in Change—Present Operations at Minimum

NEW YORK, Dec. 1—Pierre S. du Pont was elected president of the General Motors Corp. at a special meeting of the board of directors yesterday afternoon. He takes the place of William C. Durant, who ceases for the present at least to be an active factor in the affairs of the great automotive combination, although he retains his place on the board of directors. Pierre du Pont continues in his former office as chairman of the board. No other changes were made in the organization.

Announcement of the momentous change in the affairs of General Motors, which probably presages a more conservative policy than has been pursued in the past, was contained in a brief statement which said:

"Pursuant to the determination of W. C. Durant to retire from the presidency of the General Motors Corp., at a meeting of the board of directors this afternoon his resignation was accepted and Pierre S. du Pont was elected as his successor.

"Mr. du Pont represents the large interest of E. I. du Pont de Nemours & Co. in the General Motors Corp.

"No changes in the offices' personnel or in the conduct of General Motors business is contemplated."

The only announcement from Durant's office was this laconic addition to the formal statement:

"In connection with Mr. Durant's retirement from the presidency of General Motors Corp. and his plans for the future, Mr. Durant says that he intends to take a well earned vacation and devote his time for the next few months to his personal affairs."

Durant Not at Meeting

Durant declined to add to this outline of his plans, stating that he was too busy to be seen. None of the directors were communicative when the meeting adjourned. They left the General Motors building immediately without stopping for a chat with the retiring president, who did not attend the meeting.

The session of the directors lasted about two hours. The only business transacted was the election of a new president and this was a mere formality. No action was taken on the question of dividends and the time was taken up with reports of the heads of the various divisions on the general business outlook as it relates to the company.

No statement of plans for the future has been made by du Pont, who already is in charge of the corporation's affairs. Durant's personal effects were removed from the offices yesterday. It is expected the new president will devote most of his time to the direction of General Motors, although he will have the active assistance of other members of his family and of representatives of J. P. Morgan & Co.

These men have been prominent in General Motors ever since the Morgan interests bought into the company last June. It was mainly as the result of their suggestions that General Motors was among the first of the automobile companies to curtail operations last summer before the far-reaching effect of readjustment was foreseen except by those who had followed finances closely.

No Expansion for Present

It is considered unlikely that there will be any expansion of the company until industrial conditions are stabilized. General Motors is pursuing a most conservative policy at present and is producing only enough vehicles to meet immediate demands. Nearly all its plants are operating on a greatly reduced schedule and some of them are closed entirely. It is perhaps significant of the policy of the new controlling factors that the Sheridan Motor Car Co., which was to have produced two new passenger car models at Muncie failed to go into production after making public specifications of the cars and beginning an advertising campaign.

Announcement also was made at about the time the new interests came into the company that greater attention would be paid in future to the manufacture of

(*Continued on page* 1146)

GENERAL MOTORS BOARD

NEW YORK, Dec. 1—Here are the directors of the General Motors Corp.: P. S. du Pont, chairman; G. F. Baker, Jr., H. H. Bassett, A. G. Bishop, Arthur Chamberlain, R. H. Collins, W. L. Day, H. F. du Pont, Irenee du Pont, Lammot du Pont, W. C. Durant, J. A. Haskell, F. W. Hohensee, L. G. Kaufman, Sir Harry McGowan, R. S. McLaughlin, William McMasters, C. S. Mott, Seward Prosser, J. J. Raskob, A. P. Sloan, Jr., J. T. Smith, E. R. Stettinius, Edward Ver Linden, F. W. Warner, W. H. Woodin, C. M. Woolley, O. D. Young.

Airplane Seizure Is Mystery Here

Identity of American Purchasers Undisclosed—Action of Allies Creates Surprise

NEW YORK, Nov. 30—There is much speculation in aviation circles in this city over the identity of the American purchasers of eleven Junker planes of a new type, seized at Hamburg by the Allied Air Control Commission while awaiting shipment to this country. The planes are built entirely of metal along new lines. It is understood that England, France and Italy will divide them. The sudden activity of the Allies in seizing these machines has occasioned some surprise for they made no attempt to stop earlier shipments of Junkers to the United States.

The seizure was made on the ground that the Germans have failed to comply with the aviation sections of the Treaty of Versailles. The treaty prohibited the building of aircraft in Germany for six months after it was signed. This period expired July 10, but the Allies assert the Teutons have not made good on the delivery of all their military aviation material. The Allies recently demanded the huge Zeppelins, Bodensee and Nordstern, on the same ground.

It is regarded as certain that none of the seized Junkers were ordered by any of the Government departments, for the army and navy air service are entirely familiar with the plans of other nations to use the United States as a catspaw in their aerial development and they are not likely to help build up the industry in Germany. It is thought possible, however, that a commercial air navigation company which proposes a line between San Francisco, Los Angeles and Phoenix, Ariz., may have been in the market for new type German planes.

Former Shipments Not Stopped

France and England were entirely familiar with the fact that new all-metal Junker planes were being built in Germany, but for some reason best known to themselves made no effort to prevent their shipment to this country when John Larsen appeared here with his widely-heralded machines. This invasion by Germany gave the aircraft industry in the United States a black eye from which it has not yet recovered, but it is not likely this caused any special grief in the Allied countries. They regard this country as the best field for the dumping of surplus army aircraft, and Germany also seeks the penetration of the United States in helping her gain the

(*Continued on page* 1144)

Domestic Markets Continue Dull

Sales in November Show Little Gain

General Depression Shown in Reports—Used Cars and Credits Drawback

NEW YORK, Nov. 30—This month comes to an end with dealers in practically all parts of the country looking forward to the approaching shows to terminate the sales slump which has been in progress throughout the fall. While in some centers the automobile business is reported almost at a standstill, in others November was at least as good or a better month than October, which showed some improvement over September.

Despite low crop prices business generally is better in the country than in city districts. In the Middle West, where the depression has been felt for months, the farmers are beginning to sell their wheat and agencies for transporting it are improving their facilities. This is releasing some money for purchase of cars and also is prompting some truck purchases—for the transportation work itself. In the Southeast there has been a slight pick-up in automotive business in spite of uncertainty as to future prices of the principal crops, notably cotton. In the Northwest there is little present business but considerable optimism in Minnesota and Wisconsin, but conditions in Montana and the Dakotas, as well as in Colorado, are discouraging, particularly to the country dealers.

In several sections some dealers have dropped out and their lines have been absorbed by former competitors. In the main, however, despite failures here and there of intensified sales campaigns, there has been some improvement in business as a result of more intelligent and aggressive selling effort.

Des Moines—The trade situation has shown no improvement in Des Moines and conditions at present are practically stagnant as to actual sales. The situation is best illustrated by this week's experience of one important distributer who attempted a high speed sales contest backed up by a fair amount of advertising, using twelve experienced salesmen for five and a half days. The results were one sale of a second-hand Ford and one new job for April 1 delivery. Another distributer put on an enclosed car show for a week without a sale. The situation in Iowa is possibly more acute than in some States by reason of the fact that the entire business is dependent almost directly upon the farmer and the present falling scale of farm produce prices has temporarily removed him from the purchasing field. Bankers and farm organizations are holding conferences all over the State in an attempt to relieve the credit situation. Des Moines bankers say conditions will be better by Jan. 1, but automobile men can see no relief until some time later.

Philadelphia—Slow but gradual improvement in both sales and inquiries, is the way passenger car men characterize the trade situation in their line. Motor truck business remains slow and is not so good as a week or two ago. While passenger car dealers are looking to the automobile show, which will follow that in New York, to stimulate trade, the motor truck dealers will not decide until their meeting, Dec. 7, whether they will have a show this season. In the accessories line this month is reported to be the poorest in the entire year, sales generally having dropped off not only from last month but also from the corresponding month a year ago.

Atlanta—Interviews with several Atlanta dealers indicate that industry is getting back to business. The public is displaying more interest and sales are picking up gradually. No return to normal is expected for some time, but dealers are confident that after the holidays sales will experience still greater stimulus. Dealers selling cars on which prices were recently reduced state this has increased interest slightly though not to any large extent. If cotton climbs in price to any substantial degree, dealers believe normal condition of trade will result much sooner than otherwise. Similar conditions hold true throughout the Southeast, according to Atlanta distributers handling cars in surrounding States.

Denver—Some distributers say steady improvement in trade situation but others complain of a standstill, and some country dealers are reported ready to quit business until conditions are adjusted. Many are disappointed by the failure to profit, as they expected, from first payment, Nov. 15, on the sugar-beet crop, although others say it is too early to test results and predict sales the next two weeks to farmers. Some dealers are gloomy because the drop in grain prices is considered making conditions worse than for a long time. The handicap of freight car shortage is causing slow crop cashing. Some report lively gain in the number of prospects visiting passenger car salesrooms, but say there is more shopping than usual in proportion to sales made.

Cleveland—Retail trade, both passenger and commercial, is at a low ebb at the present. Price reductions that have been made in certain cars brought a slight stimulation of buying, but it is the consensus that they are merely regarded as a forerunner of other reductions and consequently it is thought consumers are

(*Continued on page* 1139)

King Claims Sold on 40 Per Cent Base

Creditors Fail to Agree on Asset Conservation Plan — May Continue Car

NEW YORK, Nov. 30—Merchandise creditors of the King Motor Car Co. who failed to agree to a plan outlined by S. S. Meyers, general counsel of the Motor and Accessory Manufacturers Association, for the conservation of its assets, now are accepting 40 cents on the dollar of their claims from C. A. Finnegan, head of the Susquehanna Holding Co. of Buffalo, who purchased the $500,000 claim of Artemas Ward, Sr., for 33 1/3 per cent.

Finnegan proposes to purchase the assets of the company in the expectation of operating it as a going concern in the old plant of the Swedish Crucible Co. under the management of A. Weber, an officer of the Buffalo company. The elder Ward sold his claims against the company which he backed, only after it became evident the creditors could not agree quickly upon a plan of procedure.

The claims of other creditors now are being purchased by Finnegan for sums running up to 40 per cent of the amount due.

This was the return date on the petition for a receivership which was filed by attorneys for the Wards, father and son. Finnegan was in court to announce that he was the majority creditor and sought control of the company through the purchase of its assets.

Holds Majority of Claims

Finnegan had expected to purchase the assets at a private sale, but it was announced by H. L. Crusoe, agent for the Detroit Trust Co., which was appointed receiver, that the receiver's sale would be held within the next two weeks and that several others would bid on the property. Though Finnegan may have to bid against other prospective purchasers his position as holder of the majority of the claims will place him in a strong strategic position, and it is considered certain the company will be continued under his direction. The merchandise creditors now have no option but to take the best offers that they can get.

The affairs of the old E. R. Thomas company and the truck division of the Chicago Pneumatic Tool Co. were wound up by Finnegan. He also tried to get control of the Allen Motor Car Co. when it was thrown into receivership, but his proposal was not acceptable to the creditors and operations were continued under the receiver.

Standard Position Shown in Statement

Annual Earning Capacity Under Reorganization $2,000,000—Total Assets $23,000,000

CLEVELAND, Dec. 1—A plain statement has been made of the financial condition of the Standard Parts Co., which since early in September has been operated by receivers on the application of a stockholder. The statement was made by the reorganization committees of the $20,000,000 parts corporation to fully inform stockholders, who are being asked to subscribe to $3,000,000 of additional preferred stock as one of several means for providing additional capital.

The statement says that the company's plants are capable of producing $40,000,000 of business a year and before the recent depression in business were actually shipping $3,000,000 in finished products a month. Lack of working capital—not lack of business—was responsible for the company's present difficulties. The reorganization plan will provide the necessary working capital.

When the reorganization plan is put into effect the company will have the following types and classes of securities outstanding: $4,000,000 loans with Cleveland banks at 6 per cent; $3,000,000 prior lien 8 per cent preferred stock; $4,050,000 Class A 8 per cent preferred stock; $5,689,500 of old 7 per cent preferred stock; 115,619 shares of common stock, no par value, while the total interest requirements and dividends is $1,502,265.

The committee says that on $20,000,000 of annual business the company should earn $2,000,000 or a net of $497,735 after interest and preferred dividends or $4.30 per share of common stock. On $40,000,000 of annual business—the maximum—the committee says $21.60 per share of common may be earned.

Inventory Totals $6,159,818

Assets are listed as follows: Cash, $181,027.75; U. S. Government securities, $7,250.00; customers' notes and accounts receivable, $3,400,851.83; less allowance for doubtful notes and accounts, discounts, $516,500, making the net of customers' notes and accounts receivable, $2,884,351.83; merchandise inventory, $6,159,818.78; securities, employees notes and miscellaneous accounts, $135,556.93; land, buildings, machinery and equipment with depreciation deducted, $11,025,833.14; investment in controlled companies Bock Bearing Co., $2,272,667.48 and Boston Service Station, $94,654.02, and prepared expenses, $191,205.32, or a total of $22,952,365.25. No credit is taken for good will, patents, etc.

The liabilities are listed as follows: notes payable $6,557,514.90; trade acceptances payable $240,483.03; accounts payable $2,665,305.50; accrued accounts $156,889.57; reserved for unentered invoices, contingencies, etc., $250,000, or a total current assets of $9,870,194. Less minimum proceeds to be realized from the sale of capital securities, within 30 days after date of subscription, $3,300,000; three months after date of subscription, $750,000; six months after date of subscription, $750,000; nine months after date of subscription, $750,000, or a total of $5,550,000 to be deducted from the $9,870,194 of current assets, leaving a balance of $4,320,194.

Liability Reserve $13,000,000

Deferred liability reserves, etc. Nominal: capital stock preferred; prior lien 8 per cent, $3,000,000; Class A, 8 per cent, $4,050,000; present preferred, 7 per cent, $5,689,500, or a total of $12,739,500 of this class plus $375,637.50 of accrued dividends, or $13,115,137.50.

Net tangible assets available for common stockholders, $5,055,979.50; 115,619 shares of no par value common stock to be issued, $18,171,116.73. Total liabilities $22,952,365.25.

The various classes of stock to be issued and outstanding stock will be protected by net tangible assets as shown in the following percentages: Prior lien, 8 per cent preferred stock, 599 per cent; Class A, 8 per cent preferred stock, 370 per cent; 7 per cent old preferred stock, 192 per cent, and common stock, 115,619 shares, $43.73 book value per share.

Franklin to Increase Capital $1,500,000

SYRACUSE, N. Y., Nov. 27—H. H. Franklin Mfg. Co. will issue $1,500,000 in 7 per cent cumulative preferred stock at par $100. Following its custom the company will offer the stock direct to the public to permit of wide distribution. By following this policy in its former issue the company has 2155 stockholders representing every State in the Union and a number of foreign countries. Through it also the company has obtained a valuable degree of advertising. The company declares that at the completion of this financing each share of preferred stock will be protected by net assets equivalent to $271.

FORD MAINTAINS SCHEDULE

DETROIT, Nov. 29—Ford Motor Co. hung up another production record last Thursday with an output of 5673 engines, 4061 of which left the factory in completed cars. The company is maintaining its schedule of 4000 a day despite the fact that the five-day a week schedule is in effect and the further fact that between 6000 and 10,000 men are off at the Highland Park and River Rouge plants. Increased labor efficiency is declared responsible for the maintenance of production schedules.

FISK ON THREE-DAY BASIS

SPRINGFIELD, MASS., Nov. 27—Beginning the latter part of this week the Fisk Rubber Co. reduced the working time of its Chicopee Falls plant from five to three days a week. About 1800 employees are affected.

Car Insurance Men Find Business Good

Sales of New Cars Have Best of It—Revision of Rates Probable

MILWAUKEE, Nov. 27—Viewed from the position of the automobile insurance man, there is a fair amount of business at the present time, somewhat more than was expected as the result of popular reports as to conditions. The insurance man, taken as a body, says that sales of new cars are having the best of it, compared to used cars. The rate with which new business is coming in is satisfactory for this season, they state.

With the election over, and the insurance man thinking about the possibilities of new legislation, the matter of rates on automobiles is receiving renewed attention.

A Milwaukee fire insurance man sums up the opinions of a conference just held privately: "Automobiles have been improved so much mechanically, that defects along these lines from our viewpoint are negligible. There is no danger of any consequence from faulty construction, whether the cars are expensive or low priced. Our records showed that most fire losses occur in garages where cars are stored. There should, in our opinion, be a flat charge for fire coverage. It is fair enough to base the collision and theft premiums upon the combined experience tables of the companies writing these two classes. We propose to make a strong fight for flat fire rates.

"Fire companies make a flat charge on dwellings. With us a dwelling is a dwelling. A particular style of dwelling is not separated out. They are all lumped and written up as a class. If we have our way there will be one class for fire insurance for which a charge of 1 per cent will be made, including cars of whatever price and cars one or two years old. We want only one other class, namely, one for all cars over two years of age, the rate on which will be 1½ per cent."

Used Cars Heavily Mortgaged

A feature causing some concern in automobile insurance circles, is the fact that many used cars bought in recent months were heavily mortgaged and bought at the higher scale of prices. As one agent expressed the matter, rather bluntly: "Let us say a man paid $800 for a used car and insured it to cover this price. To-day he has a still older car, and meanwhile he probably can buy the same car for a good deal less money. Now, to be entirely frank, there has been an increase of fires in just such cases. Outside of this, we note a decrease in thefts of cars, doubtless due to the change in the demand, but there is still a good deal of pilfering of spare parts, inner tubes and small articles. But the marked increase has been in the number of fire losses."

Sales in November Show Little Gain

Crop Conditions Important in Mid-West—Country District Trade Excels City

(*Continued from page* 1137)

holding off for further drops. Dealers here have advertised heavily the fact that prices have been stabilized and will remain so for a long time. High prices for labor and material are held forth as barriers to lower prices, but trade is far below normal, although it is probably better here than in the average large industrial centers. Automobile manufacturers have greatly reduced the number of employees and are taking steps to conserve cash for conditions that will prevail during slowdown in the industry.

Milwaukee—With no scarcity of buyers, Milwaukee automobile dealers find only one serious handicap in closing, which is that the limit on trade insurance has been reached and find it impossible to extend stocks of used cars which are not moving. Salesmen are extremely hard to get. With most dealers effort is now concentrated on relieving the used car situation. State distributers are receiving orders for spring deliveries now much in advance of usual beginning of this demand. Several sales contests have been stopped because of stagnation in the used car market. The absence of owners' efforts to sell their cars through newspapers, as is usual here this time of the year, is noticeable. Financing considerably easier locally but not in State where bank funds are still tied up with farmer loans through refusal to dispose of crops at lowering prices. Every dealer is confident throughout Milwaukee and State of big spring business and leaders say that the shows in January will start the ball rolling.

New Orleans—Owing to the uncertain condition of prices on cotton, sugar and rice, retail sales of automobiles in Louisiana territory are slow, and have been slower than was expected during the past two weeks. Sales in October showed an increase of about 25 per cent over those of September, and, while the November sales are still about that far ahead of the September sales, they show little increase over those of October. Dealers believe this is due to the failure of a number of manufacturers to lower the prices of their cars, and that the buying increase shown in October was mainly in cars whose prices have been cut. These cars are still selling, but the cars whose prices have not been reduced are now showing the same activity.

Kansas City—Sales of motor cars declined steadily from early summer levels, reaching the low point early in October. Many country dealers made no sales at all in September and October. Sales conditions in cities are weaker than in the country. The absence of demand for used cars embarrasses the dealers. While banks curtail loans dealers cannot get on a cash basis in sales of new cars. Sales range during November from nothing to twenty per cent of normal with a few exceptional firms selling closer to normal. There is a slight improvement in November over October. Wholesalers in other lines in Kansas City territory report collections this month good and indicating vastly larger volume of retail trade than in October when collections and sales were extremely low. Observers say that farmers are selling wheat more readily and also getting wheat moved. The abnormally low prices for hogs, cattle and grain cause a depression of spirit among all classes in this agricultural district which is more effective in retarding sales than the actual shortage of money. Two months is a comparative time limit for recovery from the spirit and adjustment of farmers and others to new conditions. It is reported that some small banks are so heavily loaned that they lack the necessary cash for daily transactions, and with smaller volume of money moving the daily deposits decline and consequently cash on hand has been in cases insufficient to meet checks of depositors having ample funds.

Minneapolis—Automobile business in this district is practically at a standstill in Minnesota and Wisconsin. In the Dakotas and Montana it is apparently dead. In the latter States farmers held their crops too long for higher prices, but in Minnesota and Wisconsin assets are in better shape because of the diversified crop. A distributer just returned from South Dakota found dealers pretty blue. As heretofore it is practically impossible to finance dealers or farmers.

Seattle—On the whole, motor car dealers in Seattle and vicinity report a gradual revival of business in recent weeks, and there is marked optimism afloat regarding the prospects for spring trade. The gloom that has enshrouded many quarters of the local trade is fast disappearing before an increasing movement of cars. One of the features of the local situation recently has been the elaborate manner in which dealers have been reducing the stocks of used cars to as low a minimum as possible in order to clear the way for a good business in new cars that is generally anticipated.

BRISCOE TAKES ON MEN

JACKSON, MICH., Nov. 27—Marked improvement has developed in the labor situation within the last week and many of the unemployed again are at work in the factories. Briscoe Motor Corp. replaced twenty-five men last week and forty this week and company officials said the force would be reinstated gradually until the plant again was in full production with its full roster of 1200 employees.

Hayes Wheel Co., and Frost Gear and Forge Co., which had laid off about 60 per cent of their employees are reinstating them gradually as improved conditions in the automobile industry indicates steady upward trend.

Peerless Dividend Cut to 6 Per Cent.

Action Taken by Directors to Conserve Cash—Reduces Bonded Indebtedness

CLEVELAND, Nov. 27—Stock of the Peerless Truck & Motor Corp. has been placed on a 6 per cent dividend by directors of the corporation this week. This is a reduction from a 10 per cent basis, the action coming when the directors announced that a quarterly dividend of 75 cents a share, payable Jan. 1 to stockholders of record of Dec. 1, had been declared.

The reduction was made to conserve the cash of the company, so that the corporate interests as well as those of the stockholders may be best looked after during the abnormal conditions that now prevail. A statement issued by B. G. Tremaine, president of the company, after the directors' meeting reads as follows:

"Directors of the company believe that affairs of the company are in a condition to meet the present depression in the automobile industry and to again prosper when normal conditions are restored; but they have considered it advisable to reduce the dividend to 75 cents a share for the purpose of conserving the cash of the company and to properly protect the principal which its stockholders have invested in the business.

"During this depression the Peerless Truck & Motor Corp. and its subsidiaries has continued to discount purchase invoices and has not found it necessary to use trade acceptances or to borrow money from the banks. At the close of business on Oct. 31 the consolidated balance in cash, United States Treasury certificates, maturing Dec. 15, and sight drafts deposited with banks for collection was $2,225,570.76. Of this sum the sight drafts amounted to only $125,387.03.

Buys Back Notes in Market

"To date this year the company has purchased on the open market and deposited with the trustee $430,300 par value of its $5,000,000 ten-year gold notes maturing Nov. 10, 1925. Including this year's purchases, it has now reacquired and deposited with the trustee $2,694,850 par value of these notes. Thus more than half of the funded debt has been paid in half of the period for which the loan was made.

"A physical inventory is taken and an audit is made by public accountants at the end of each year to accurately determine the earnings of the corporation and the deductions for Federal taxes. The directors believe that this statement will show that the dividends paid this year have been amply earned and that the book value of its stock will be higher than that shown in the statement for the year 1919, which was approximately $36 a share exclusive of patents, franchises, special reserve and good will."

French Car Exports Gain 451 Per Cent.

Ten Months of 1920 Show $281,405,400 Total—Imports Off 38 Per Cent

PARIS, Nov. 27 (*By Special Cable*)—French automotive exports for the first ten months of 1920 increased 451 per cent over the corresponding period of 1919. Totals for the trading during that period of this year, officially announced, were $281,405,400. Of that amount, $142,219,400 were represented by passenger cars. Automotive imports into France, in contrast with this increase of exports, showed a decline of 38 per cent for the ten months period of this year.

The attempt to auction the French factory of the Continental Tire Co. on which a minimum value of 12,000,000 francs was placed, has failed as no purchasers have come forward. The belief in France is that the plant will be purchased by some of the American tire makers, but Goodrich has declared itself to be not interested. It is doubtful if others will be attracted as the factory is poorly equipped for production.

The difficulties in which the Berliet company has found itself has brought forth a plan from Berliet that the company abolish all of its founders' shares by issuing new shares to be paid for in cash. A meeting will be held shortly at which it will be determined whether Berliet can induce other holders of the founders' shares to follow him in this action.

The Austrian Daimler and the Austrian Fiat have joined forces. The new company has a capitalization of 120,000,000 crowns.

In Italy the Anti-Protectionist party of Parliament protests the recent automobile duties, declaring that they will not harm foreign manufacturers, but will seriously affect consumers. The Government reply was that their action only followed the example set by other nations, being anxious to secure uniform automotive imports with all nations.

The Allied Mission has authorized the Zeppelin companies to manufacture a giant passenger carrying monoplane of all metal construction equipped with four Maybach engines of 260 horsepower each. Breguet, it became known, is completing a giant all-metal biplane especially designed for trans-Mediterranean service. The plane is powered with four Bugatti engines on a single propeller.

MEDITERRANEAN TRADE GROWS

WASHINGTON, Nov. 26—Replies by American consular agents to questionnaires sent out by the Department of Commerce and to letters of exporters, indicate a growing demand for American automotive products along the southern tier of Europe.

American motorcycles are becoming popular in the consular district of Patras, Greece, where the roads are too rough to permit rapid operation of other types of motor vehicles. The laws of Greece require all motorcycles to be equipped with double brakes. The road conditions do not permit the use of sidecars as the country is, in the main, mountainous.

There is a fair demand for automobile accessories in Malta where the sales of American passenger cars continue to grow. A market exists in Saloniki, Greece, for American tires though there are no established dealers in this district. Large purchases of surplus cars and trucks belonging to the British armies afford good opportunities for the sale of tires and inner tubes.

Belgian Imports From United States Increase to 1179 Cars in Current Year

PARIS, Nov. 15 (*Special Correspondence*)—Belgium's automobile situation, completely transformed by the war, has not yet returned to normal, if a comparison is made of imports and exports for the last few months and those of the year 1913. Before the war Belgium's best customer was Great Britain, but in addition she sold cars in practically every country in the world. She imported from France, Germany and England, but received very few cars from America. Business with England has been resumed, but no business has yet been done with the Argentine, Brazil, Roumania and India. The United States, on the other hand, has jumped her imports into Belgium from 77 cars in 1913 to 1179 for the first eight months of the present year.

The following figures, which show imports and exports, together with the country of origin and destination, have been prepared by the Government commercial department:

YEAR 1913—BELGIAN EXPORTS AND IMPORTS

Country	Belgian Exports		Belgian Imports	
	Complete Cars	Chassis	Complete Cars	Chassis
Germany	74	307	124	128
United States	47	15	77	..
France	49	224	266	325
Great Britain	302	556	102	24
Italy	7	13	1	18
Netherlands	36	150	29	1
Switzerland	4	..	4	5
Argentina	412	6	..	..
Australia	49	55	..	..
Austria	27	38	..	..
Brazil	133	..	..	..
Chili	27	..	..	..
China	1	..	..	..
Cuba	28	..	..	..
Denmark	9	..	..	..
Egypt	2	..	..	..
Spain	31	29	..	..
British India	64	8	..	..
Dutch India	45	..	..	..
Japan	4	..	..	..
Morocco	3	..	..	..
Mexico	33	..	..	..
Norway	19	..	..	..
Portugal	67	6	..	..
Roumania	110	..	..	..
Russia	46	9	..	..
Siam	1	..	..	..
Sweden	21	34	..	..
South African Union	5	..	..	..
Uruguay	11	..	..	..

JANUARY TO AUGUST 1920—BELGIAN EXPORTS AND IMPORTS

Country	Belgian Exports		Belgian Imports	
	Complete Cars	Chassis	Complete Cars	Chassis
Germany	6	6	368	42
Spain	95	..	..	..
United States	3	1	1179	101
France	65	15	724	360
Great Britain	288	..	89	22
Italy	..	204	129	150
Netherlands	173	..	42	..
Portugal	108	..	..	..
Other countries	94	84	75	7

ITALY ADDS TO ENGINE TAX

NEW YORK, Nov. 26—Italian import duties on farm traction engines weighing less than 2500 kilos have been increased by a surtax of 35 per cent ad valorem above the regular duties

Agnelli to Remain As Fiat President

Reconsiders Resignation Offered in October—New Industrial Plan Creates Restiveness

(*Special Cable*)

TURIN, Nov. 29—Commandatore Agnelli, president of the F. I. A. T. automobile plant here, who tendered his resignation Oct. 28, has yielded to the appeals of stockholders and employees, and reconsidered his action. When he announced that he had resigned, President Agnelli declared that his proposed cooperative arrangement, under which the workingmen took over the great automobile plant, had not been accepted in the right spirit by the workingmen's organizations. Representations by employees since then has changed his position.

At the outbreak of the last dispute the directors of the Fiat company adopted a very conciliatory attitude, but despite this the strikers took possession of the factory, and were encouraged by the Government. Engineer Fornaca severely criticized the political attitude of Premier Giolitti, declaring that as a consequence the Italian industry was disorganized, no outside credit was obtainable, and there were threats of still more labor trouble.

It was because of these unsatisfactory conditions that the directors of the Fiat company offered to turn over the whole of their establishment to the workers, but this offer was refused on political grounds. As examples of the crippling influence of the present unrest, it was stated that contracts with the Italian and British Governments for the purchase of old ships, to be broken up for scarp metal, had had to be cancelled and work on the new factory had been stopped.

In answer to questions by shareholders, it was stated that a Red Guard still existed and kept a watch over the works and the offices; 40 engineers and 964 workmen had been driven out of the shops by the extremists, the directors being powerless to keep them in their situations.

Crisis Not Due to Ill Will

Signor Buozzi, secretary of the F. I. O. M., the leading metal worker's organization, declares that the present crisis is not due to the ill will of the workers, but has been caused by the tactics of the directors of the big companies. Buozzi says that since the present organization which gives the workers a voice in shop management, went into effect, the output of the Fiat factory has increased from 43 to 61 cars a day.

Manufacturers will not consent to accept smaller profits, and they do not want to admit workers into the shop committees. They are also in league with the banks to cause the withdrawals of credit from all small manufacturers. Buozzi maintains that the Fiat directors never consulted heads of departments, with the result that there was internal mismanagement, and joint shop committees of workers and managers became absolutely necessary.

Signor Lancia, head of the Lancia company, at Turin, claims that the recent movement in Italy was not a revolution. Although output has been delayed by the disturbance, the air has now been cleared and production at the present time is on a satisfactory basis. Signor Cuneo, commercial manager of the Isotta-Fraschini company also stated that production was back to normal, and although some labor problems remained to be solved his factory was in production and there was no ground for the belief that Italy was on the point of falling into Bolshevism.

Engineer Soria, of the Fiat company, insisted that the movement was professional and not really political. The daily press had attached an exaggerated importance to the Italian outbreak, whereas the Italian automobile industry was in a more advanced condition than that of other European countries. As a proof of this, every Italian manufacturer of importance took part in the London show, and they all exhibited new models, whereas certain firms in other countries were still producing their pre-war designs.

American Cars Lead in Norway Markets

WASHINGTON, Nov. 26—Nels A. Bengtson, U. S. Trade Commissioner to Norway, in a study of Norwegian markets issued to-day declared that American automobiles and trucks are so predominant in Norway that they give a distinct American touch to the street traffic. He anticipated a decline in demand for American cars with the revival of competition by other nationalities, though the market for tractors will increase rather than diminish.

The commissioner stated that American cars have proved so adaptable to the needs of Norwegians that they will continue to hold first place despite growing competition.

The narrowness of some of the Norwegian roads creates a special demand for motorcycles with side cars and for narrow-gauge automobiles. There are nearly 8000 miles of improved highways in the country as against 12,926 miles of country roads, of which some are only bridle paths. In general the main highways are adaptable to automobile and truck traffic.

SWISS CAR DEMAND GOOD

WASHINGTON, Nov. 27—American automobiles form 40 per cent of the total number of motor cars used in Geneva and other Swiss cities. The State Department has been advised that a recent survey showed one motor vehicle for every 45 inhabitants. The demand continues to grow for the Swiss people are prosperous chiefly because of the country's neutrality. Statistics show that 2206 motor vehicles were operated Aug. 20, as compared with 1520 Jan. 1, 1920.

Truck Sales Results Unaffected by Cuts

Same Business Conditions Reported by All Manufacturers —Car Reductions Wise

CHICAGO, Nov. 27—Merchandising is as important in the handling of motor trucks as it is in that of automobiles, said David Thomas, general manager of the Motor Truck Manufacturers Association, in discussing conditions in the industry.

"The motor truck manufacturer has had brought home to him, in passing through the period of difficult credit," he stated, "that he must look more carefully to the merchandising of his product. That history repeats itself is a fallacy. Pre-war conditions are never to return. The pre-war conditions of the motor truck industry will never return.

"The motor truck distributer must be more than an 'order taker.' He must have sales agility and discrimination which will enable him to sell the right truck to the right party. He must have financial responsibility. The distributers of motor trucks who had these qualifications received, during the period of depression, the credit that they would have received had they been the distributers of any other equally essential commodity."

That the recent cut in prices on motor trucks did not materially affect sales is the conclusion he drew from a careful survey of the situation.

"The manufacturers of motor trucks who recently cut prices and those who recently guaranteed prices and those who did neither report like results," he said, "The automobile manufacturers who recently cut their list prices, on the other hand, report an increased volume of sales amounting in one instance to as much as 400 per cent."

The difference in results, Thomas held, is due to the difference existing between the truck industry and the automobile.

Differs from Car's Standing

"It was the recent cutting of prices in the automobile industry that started the recent cutting of prices in the motor truck industry," Thomas said in discussing this phase of the situation. "To have expected an increase in the volume of sales of automobiles at that time by reducing the list price was a correct psychological anticipation. But the conditions of the manufacture, distribution and sales of the product of the motor truck industry on the one hand and the automobile industry on the other are very different. No one will say but that the interests of the two industries overlap in many instances, but the motor truck manufacturer is liable to great error if he does not recognize the fact that he represents an industry that is essentially different from the automobile industry. The results of price cutting in the two industries drive this fact home."

Exports of Automobiles and Tires for September

COUNTRIES	Motor Trucks				Passenger Cars				Parts	Tires			All other tires
	Complete Cars		Chassis		Complete Cars		Chassis			Casings	Inner tubes	Solid tires	
	Number	Dollars	Number	Dollars	Number	Dollars	Number	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Europe													
Austria	...	.....	...	.....	...	.....	...	.....	.....	1,169	.....	.....	.....
Azores and Madeira Islands	...	.....	...	.....	...	.....	...	.....	1,130	.....	.....	.....	.....
Belgium	...	.....	...	.....	237	333,199	...	.....	11,612	56,780	2,913	.....	160
Denmark	1	2,389	4	13,720	18	34,044	...	.....	315,142	63,386	3,009	.....	.....
Finland	6	15,623	6	17,475	20	27,302	...	.....	4,219	5,577	512	5,608	500
France	...	.....	...	.....	32	51,406	...	.....	70,277	172,237	241	5,135	80
Germany	...	.....	...	.....	2	6,220	...	.....	824	11,668	1,635	.....	6
Gibraltar	...	.....	...	.....	5	6,563	...	.....	.....	.....	.....	.....	.....
Greece	16	8,940	...	.....	151	94,978	...	.....	3,071	9,632	14,308	.....	97
Iceland and Faroe Islands	...	.....	...	.....	4	3,800	...	.....	1,469	.....	.....	.....	.....
Italy	...	.....	...	.....	...	.....	...	.....	12,781	2,852	382	.....	.....
Malta, Gozo, and Cyprus Islands	2	8,000	...	.....	3	2,752	...	.....	600	.....	.....	.....	.....
Netherlands	10	18,205	5	5,322	169	187,024	...	.....	13,512	130,097	13,773	7,300	54
Norway	26	48,539	5	4,460	100	176,022	1	900	34,628	68,478	5,825	3,595	.....
Poland and Danzig	...	.....	...	.....	91	59,940	...	.....	223	29,640	6,159	.....	.....
Portugal	1	5,500	...	.....	10	24,450	...	.....	6,908	8,861	64	.....	.....
Roumania	...	.....	...	.....	3	6,625	...	.....	.....	138	36	.....	.....
Spain	17	36,948	1	2,679	91	155,602	5	16,096	20,240	46,677	2,932	.....	.....
Sweden	38	89,249	139	163,859	635	765,938	6	11,838	13,427	327,185	22,822	205	8,518
Switzerland	...	.....	...	.....	158	257,202	...	.....	3,684	24,606	2,472	.....	.....
Turkey in Europe	...	.....	...	.....	25	15,110	...	.....	94	2,866	241	.....	.....
England	100	130,395	38	60,462	1382	1,441,894	175	205,345	2,462,515	216,774	22,193	8,842	6,691
Scotland	...	.....	29	33,996	27	33,460	...	.....	1,906	4,893	600	.....	.....
Ireland	1	1,000	...	.....	55	59,024	...	.....	.....	.....	.....	.....	.....
North and South America													
British Honduras	...	.....	...	.....	...	.....	...	.....	412	158	56	.....	53
Canada	75	123,887	29	68,412	547	766,840	11	21,047	1,831,132	105,360	16,053	28,153	2,305
Costa Rica	...	.....	...	.....	11	15,580	...	.....	1,274	300	.....	.....	.....
Guatemala	1	1,062	...	.....	21	27,491	1	1,680	2,001	2,429	193	58	.....
Honduras	...	.....	...	.....	1	625	...	.....	5,110	285	.....	.....	.....
Nicaragua	...	.....	...	.....	3	2,628	...	.....	7,091	1,496	158	124	.....
Panama	14	6,650	...	.....	27	22,927	...	.....	4,264	13,891	2,739	.....	.....
Salvador	2	4,618	...	.....	16	31,448	...	.....	4,791	5,697	223	.....	.....
Mexico	93	142,395	29	55,061	493	503,990	2	1,219	87,990	118,947	26,463	3,160	6,169
Newfoundland and Labrador	...	.....	...	.....	3	4,150	...	.....	2,277	856	656	.....	55
Barbados	...	.....	...	.....	11	11,421	...	.....	3,407	.....	.....	52	131
Jamaica	...	.....	15	12,175	31	30,342	...	.....	9,289	8,550	365	52	.....
Trinidad and Tobago	8	20,326	14	33,673	19	24,328	...	.....	11,753	5,357	1,074	515	3,785
Other British West Indies	4	2,134	1	202	2	1,325	...	.....	3,070	2,998	1,324	55	65
Cuba	...	.....	34	77,227	1054	1,066,107	4	7,393	424,575	382,007	55,561	24,465	9,722
Virgin Islands of U. S.	160	396,251	...	.....	7	5,073	...	.....	2,178	1,295	.....	.....	.....
Dutch West Indies	...	.....	...	.....	...	.....	...	.....	166	1,223	24	63	.....
French West Indies	...	.....	...	.....	...	.....	...	.....	2,497	1,691	167	800	.....
Haiti	2	1,020	...	.....	17	14,100	...	.....	1,839	2,639	2,050	326	.....
Dominican Republic	2	3,300	20	18,965	63	50,388	1	2,500	15,878	20,039	3,110	2,703	1,372
Argentina	9	14,208	11	33,526	409	555,640	2	6,500	688,878	428,582	40,109	4,158	4,918
Bolivia	...	.....	...	.....	...	.....	...	.....	207	90	.....	.....	.....
Brazil	75	61,071	10	16,785	251	416,838	...	.....	248,518	111,795	36,372	5,550	2,456
Chile	4	9,133	1	7,000	18	49,385	...	.....	15,144	8,561	919	562	2,548
Colombia	18	19,876	...	.....	56	84,208	1	600	25,104	8,859	1,795	20	248
Ecuador	2	4,550	...	.....	4	7,622	...	.....	948	255	44	.....	.....
British Guiana	...	.....	1	690	5	5,525	...	.....	2,437	805	935	.....	.....
Dutch Guiana	...	.....	...	.....	2	5,770	...	.....	6,276	120	.....	.....	.....
Paraguay	...	.....	...	.....	...	.....	...	.....	1,792	.....	.....	.....	.....
Peru	10	33,335	3	11,233	29	40,407	...	.....	32,445	10,351	1,998	2,639	.....
Uruguay	10	5,760	...	.....	387	407,978	31	21,022	35,087	110,421	13,960	.....	638
Venezuela	4	1,750	3	6,555	58	62,342	...	.....	8,120	20,757	3,189	54	160
Asia and Far East													
Aden	...	.....	...	.....	5	8,223	...	.....	769	3,158	349	.....	.....
China	18	26,605	17	17,024	50	124,019	2	8,545	37,268	28,145	2,232	146	246
Kwantung, leased territory	...	.....	...	.....	...	.....	...	.....	.....	248	.....	.....	.....
Chosen	...	.....	...	.....	...	.....	...	.....	1,737	.....	663	.....	.....
British India	46	90,048	103	213,694	940	1,159,882	3	10,611	128,278	56,148	8,533	4,170	.....
Straits Settlements	19	35,636	6	11,600	245	289,529	...	.....	64,843	139,283	3,195	14,664	.....
Other British East Indies	...	.....	...	.....	33	45,025	...	.....	11,247	.....	.....	.....	.....
Dutch East Indies	12	27,603	11	24,459	113	164,667	1	3,600	51,430	137,035	5,575	64,100	1,498
French Indo China	2	1,984	...	.....	34	45,054	...	.....	2,167	.....	.....	.....	.....
Hongkong	1	3,712	1	2,000	32	63,143	...	.....	1,434	905	.....	.....	.....
Japan	15	53,139	16	33,032	55	98,934	30	40,777	26,290	36,369	4,527	1,600	4,249
Persia	...	.....	...	.....	15	9,900	...	.....	.....	912	1,461	.....	.....
Russia in Asia	...	.....	...	.....	...	.....	...	.....	2,099	.....	.....	.....	.....
Siam	4	4,965	...	.....	1	1,350	...	.....	604	.....	.....	290	.....
Turkey in Asia	1	2,970	1	1,856	10	11,935	1	2,550	1,560	3,721	3,656	.....	.....
Australia	17	46,572	67	114,493	156	208,059	484	417,070	162,444	150,188	7,965	12,080	8,453
New Zealand	19	46,923	28	46,324	439	571,667	27	41,343	126,719	216,883	9,088	41,872	5,031
Other British Oceania	...	.....	...	.....	8	10,445	...	.....	722	2,747	345	.....	35
French Oceania	1	2,900	1	2,833	...	.....	...	.....	990	2,573	376	.....	298
Other Oceania	...	.....	...	.....	2	1,693	...	.....	2,413	197	70	190	.....
Philippine Islands	88	100,222	94	173,174	296	390,482	...	.....	92,928	235,678	35,745	27,807	956
Africa													
British West Africa	14	20,839	8	18,648	4	4,463	7	15,284	23,199	56,702	13,031	.....	.....
British South Africa	19	41,241	9	10,941	353	451,702	5	6,247	94,208	237,139	39,673	459	5,620
British East Africa	...	.....	...	.....	4	11,130	...	.....	1,017	105	20	.....	.....
Canary Islands	...	.....	...	.....	5	9,691	...	.....	37	.....	.....	.....	.....
French Africa	...	.....	...	.....	...	.....	...	.....	50	9,386	.....	.....	.....
Kamerun, etc	...	.....	...	.....	...	.....	...	.....	52	329	50	.....	.....
Morocco	...	.....	...	.....	2	2,800	...	.....	.....	225	.....	.....	.....
Portuguese Africa	...	.....	...	.....	11	23,203	...	.....	2,763	.....	.....	.....	.....
Spanish Africa	...	.....	...	.....	...	.....	...	.....	219	6,517	144	.....	.....
Egypt	...	.....	...	.....	55	41,900	...	.....	7,252	.....	.....	.....	.....
Total	987	1,721,473	760	1,313,555	9631	11,705,929	800	842,167	7,311,951	3,883,923	446,352	271,572	78,597

October Exports Continue Climbing

Lead September by Over $5,000,000 and October, 1919, by About $7,000,000

WASHINGTON, D. C., Dec. 1—Statistics compiled by the Bureau of Foreign and Domestic Commerce to-day show tremendous increases in the volume of exports and imports of automotive equipment for October and the nine previous months of this year. A total of 121,787 passenger cars valued at $139,096,244 were exported since January as compared with 52,189 cars valued at $57,458,726 for the same period in 1919.

During October this year 11,562 passenger cars valued at $14,699,402 were exported as against 7898 cars valued at $8,634,965 for the same month last year. The exports of commercial cars for October, 1920, amounted to 2432 cars valued at $4,018,126, as compared with 1301 cars and a value of $2,931,204 for October, 1919. The ten months' total for this year was 24,546 commercial cars with valuation of $38,610,983. The physical volume of truck shipments was doubled for in the corresponding period last year 12,392 commercial cars were sent abroad with a valuation of $29,746,033.

Parts, not including engines and tires for October, 1920, were valued at $6,910,538 or about 100 per cent increase over the same month last year when exports totaled $3,525,115. The ten months' total this year of these parts amounted to $69,337,409 or more than doubled the total for the ten months of 1919, when exports were valued at $33,921,088.

In both passenger cars and trucks clear gains are shown over September this year; this amounting to about $4,000,000 in cars and $1,000,000 in trucks.

N. A. C. C. to Advertise Essentiality of Cars

NEW YORK, Dec. 3—The directors of the National Automobile Chamber of Commerce decided at their monthly meeting here yesterday to appropriate a substantial sum with which to carry on an advertising campaign in New York and Chicago during the show periods to demonstrate the essentiality of motor vehicles as transportation. The aim of the advertising will be to convince bankers and business men in all lines that motor cars are indispensable as utilities. A by-product of the campaign will be the good it will do the dealers in the territory surrounding the two large cities.

The directors also decided to appoint a tax committee which will review the entire tax situation as it relates to the automotive industry so that proper presentation of the subject can be made to Congress when the subject of taxation is taken up.

Incomplete reports for the month of November showed that 13,000 carloads of automobiles were shipped in that month by the manufacturers of the country, together with 6000 driven away and 1000 transported by boat. This, compared with 26,690 carloads shipped in November of last year, 10,000 driveaways and 2059 shipped by boat. Carload shipments for October numbered 17,186, as compared with 29,843 for October, 1919. Driveaways in October numbered 14,101, as compared with 13,402 in the previous October.

UNJUST TO OPPOSE PRICE REDUCTIONS

SYRACUSE, Nov. 29—Syracuse Rubber Co., Inc., manufacturers of Syra-Cord tires, have made a 12½ per cent reduction in the price of Syra-Cord tires and a 15 per cent reduction on tubes.

"We decided to make this reduction," says J. B. Losey, general manager, in commenting on the fact, "to do our bit toward bringing the country back to a pre-war basis. We feel that any manufacturer who holds out against this movement when he can possibly sell his product for any less is impeding progress and doing an injustice to the country."

Fiat Reduces Prices On All New Models

NEW YORK, Nov. 30—Price reductions will go into effect on all Fiat motor cars on Dec. 1. The new prices will be as follows, c. i. f. New York, war tax excluded:

Model 501—Chassis, $2,300; touring, $2,575; sedan, $3,275.

Model 505—Chassis, $3,200; touring, $4,600; landaulet, $5,200.

Model 510—Chassis, $4,100; touring, $5,720; landaulet, $6,450; limousine, $7,185; sport chassis, $4,300; sport touring $6,250.

Metropolitan sales office and showrooms are being opened at 150 West Fifty-seventh Street, where it is planned to show all new models. General offices of the company will be continued at 501 Fifth Avenue.

NASHVILLE BUYS "OLD HICKORY"

NASHVILLE, TENN., Nov. 26—"Old Hickory" powder plant at Jacksonville, twelve miles east of Nashville on the Cumberland River, has been purchased from the Government by the Nashville Industrial Corp., composed of Nashville business men. It is to be developed into a manufacturing center, having available immense housing and manufacturing building facilities.

This was the largest Government manufacturing undertaking during the war, costing $87,000,000. It occupies 5000 acres.

Firestone Reduces Salary Schedules

Ten Per Cent Drop Simultaneous With Dividend Cut and Production Decrease

AKRON, Nov. 30—Official announcement was made to-day by H. S. Firestone, president of the Firestone Tire & Rubber Co. of this city, of a ten per cent reduction in salaries of all employees, effective Dec. 1, and of a reduction also in the company's dividend rate from $2 to $1.50 per share per quarter.

Although practically all rubber industries in Akron for several months past steadily have reduced wage scales by reducing factory operating forces and then re-employing men at a much lower scale, this is the first salary cut to be announced. Whether it will be followed by other tire companies in Akron was a matter only of conjecture. In Akron today no announcement was forthcoming from any other tire concerns nor would officials of other companies comment upon the action of the Firestone officials.

Also effective Dec. 1, it became known to-day, the Firestone factories will start working on a basis of 25 hours a week or five hours a day on a five day week. This reduction in operating schedules is in addition to heavy reduction of factory operating forces during the past weeks.

"In announcing this reduction for salaried employees, the Firestone Tire & Rubber Co.," reads the official announcement, "has given full and careful consideration to every phase of the present economic situation. Conditions have necessitated a retrenchment in every line of production. Salaries came last but could not be excepted. It is only fair in making this announcement that attention should be called to the fact that at the same time the company also reduced the returns on the money invested in the business, in other words, the dividend rate from $2 to $1.50 per share per quarter, which means that the income of capital was reduced 25 per cent.

"The operation of the law of economics cannot be avoided by artificial support of the pay envelope. The same conditions that have caused this salary reduction are also operating to reduce the cost of living. Commodity prices have come down somewhat already and there is every indication that they will continue to decrease for an indefinite period.

Had Increased 20 Per Cent

"During the past twelve months the Firestone company increased salaries 20 per cent. It met the increased cost of living to its employees last January with a raise of 10 per cent and added another 10 per cent last April when the peak of high prices was reached. It has now asked its salaried employees to accept a reduction commensurate with the demands of good business principles and the present economic conditions. They have co-operated appreciatively."

Templar Is Cleared, Suit Angers Court

Application for Receiver and Intent Branded as Serious Moral Crime

CLEVELAND, Nov. 30—Application for the appointment of a receiver for Templar Motors Corp. by J. W. Wilson, a stockholder of the company, was dismissed to-day in Common Pleas court by Judge Levine, who branded the application and the intent back of it as just as serious a moral crime as causing a run on a bank.

Wilson had asked for the appointment of a receiver alleging fraud, deceit and mismanagement of the affairs of the company. The company made a general denial and asked that the application be brought to immediate hearing. In filing his application Wilson had not done this.

After hearing the evidence in the case and dismissing the action, Judge Levine said:

"I hold that to file a petition alleging the grossest kind of accusations against a perfectly solvent firm for the purpose of creating suspicion in the mind of the public concerning its affairs, and without any actual ground for the same, is morally just as much of a crime as causing a run on a bank. The bar association through its proper agencies will see fit to look into this matter and if it is brought to my attention that any attorney at this bar had, without proper cause, but merely to carry out the design of a scheming client, prepared a petition containing these allegations of fraud, deceit and mismanagement, well knowing that the same were not true, I would then promptly and without hesitation, say that the severest sort of discipline shall be applied to such attorney."

Wilson had alleged that the company had never been on a paying basis, but had paid eight quarterly dividends from money received from the sale of stock.

Assets Exceed $8,000,000

M. F. Bramley, president of Templar, said the filing of such a petition was absurd, and that the condition of the company did not warrant such action. "Our company has more than $8,000,000 assets," he said. "Our outstanding indebtedness is not more than $600,000. At present we have on hand $1,000,000 in finished cars. Two months normal business and every dollar of indebtedness would be wiped out. The condition of our business is far from being as represented by Wilson. The suit was filed to injure the reputation of the corporation."

A faction of the stockholders have been complaining about the company's management and several meetings of stockholders have been held. At one of these in Columbus there was a stormy scene which wound up in a vote of confidence in the management after Bramley had read a statement of the company's operations and financial condition. At a subsequent one in Cleveland handbills were distributed denouncing the management and discussing company finances. This meeting likewise ended in a vote of confidence in the officers.

Attorneys Walter D. Meals and John H. Orgill, on behalf of Templar company, filed a motion to advance to immediate hearing the application for the appointment of a receiver.

Meals said many millions of dollars have been invested in the company, and that a large number of persons, including creditors, are vitally interested in its welfare. The pendency of the action jeopardizes the investment rights of the creditors, he said, and is a menace to the business of the concern.

Airplane Seizure Is Mystery Here

(*Continued from page* 1136)

much to be desired supremacy of the air.

The arrival of the all-metal Junker plane upset the plans of the War and Navy Departments and held up the awarding of contracts to American manufacturers. It now has been demonstrated, however, that the eight Junkers purchased by the Post Office Department did not make an enviable record in actual performance. Here is the actual record of their performance:

No. 301—Flew 4965 miles and was withdrawn.

No. 302—Flew 1080 miles and was withdrawn.

No. 303—Flew 3360 miles and was withdrawn.

No. 304—Flew 1365 miles and on Aug. 20 Pilot Max Miller nearly lost his life when it caught fire in the air.

No. 305—Flew 1940 miles and on Sept. 1 crashed in flames, killing Miller and his mechanic.

No. 306—Flew 2125 miles and was withdrawn.

No. 307—Flew 755 miles and was withdrawn.

No. 308—Flew 530 miles and then crashed in flames, causing the deaths of Pilot Stevens and his mechanic.

The eight machines flew a total of 16,120 miles, caused four deaths and had a half-dozen crashes. They were overhauled by the Post Office Department and it was found they had no less than 34 connections in the hood, any one of which might have caused disaster. The air mail service now has cut out all but one of these connections and removed all the rest to a box under the fuselage. The planes were purchased over the counter for $30,000 each without tests.

TO FINANCE DODGE DEALERS

NEW YORK, Nov. 30—The Bankers' Commercial Security Co. of this city, which hitherto has financed only truck dealers, has entered into a contract with Dodge Brothers Motor Car Co. to finance Dodge dealers. The company is taking up cars for dealers both on the storage and retail plans. Dodge is now working three days a week, making 625 cars a day. Reports of the number of completed Dodge cars in the hands of dealers are said to be much exaggerated.

Wilson Restrained in Steel Body Suit

Temporary Order Issued Pending Final Decision—Employees Held for Testimony

DETROIT, Nov. 30—C. Haines Wilson, treasurer and general manager of the C. R. Wilson Body Co., and Paul Breneman, a Wilson employee, have been ordered to appear before the Federal grand jury in connection with an alleged infringement of an all-steel body patent of Edward G. Budd Co., Philadelphia, and wrongful use of Budd blue prints. Both men were ordered held in $5,000 bail to await the action of the grand jury.

The order for their arrest resulted from testimony in the infringement case to the effect that Breneman was former chief draughtsman for the Budd company and left that organization with several assistants at the instigation of Haines Wilson. It was asserted that Breneman took with him blue prints which are alleged being used by Wilson to develop all steel bodies infringing the Budd patents.

At the hearing Oct. 2 Breneman denied bringing blue prints with him to the Wilson company and Haines Wilson disclaimed knowledge of an attempt to acquire ideas from such blue prints or from other information wrongfully. Subsequently, according to Judge Tuttle, Breneman admitted bringing certain blue prints which have disappeared. Attorneys for the Wilson company said no all-steel bodies built under Breneman's supervision have been put into production, but were submitted only to automobile manufacturers.

The hearing on the infringement case was continued and a restraining order issued under which the Wilson company is enjoined from using the name "all steel," and from enticing or soliciting Budd employees to leave. It is also restrained from using patterns or designs alleged stolen from Budd and from infringing any Budd patents. The Wilson company is also ordered to return any blue prints or drawings of the Budd company now in its possession.

Air-O-Flex Petition Filed by President

DETROIT, Nov. 29—G. M. Walker, Jr., president of the Air-O-Flex Automobile Corp., has filed a petition asking that the company be declared bankrupt. Liabilities of $21,344.12 are listed and assets of $19,300.88. The petition declared that stockholders refused to attend meetings and asked that the affairs of the company be wound up.

The assets include two experimental trucks valued approximately at $16,000. Cash balance in the bank totals $2.56.

The corporation was organized in Delaware in 1917 with a capital of $2,500,000, to build trucks with Air-O-Flex suspension cylinders instead of springs. It was given permission to sell $2,300,000 stock.

Connecticut Checks Heavy Truck Use

Will Issue Special Permits for Winter Operation—Owners Protest Drastic Act

NEW LONDON, CONN., Nov. 27—Effective from Dec. 1 to May 1, operators of trucks weighing five tons or more, or where the combined weight of truck and load is in excess of 10 tons, will be refused use of the State highways, unless under special permit and traveling under certain conditions, according to the edict of State Highway Commissioner Bennett this week. It is stated that the 10-ton ban would virtually bar trucks of five-ton model from winter use on State highways, dealing a crippling blow to the thriving ship-by-truck industry.

Already a storm of protest has arisen with truckmen, automotive dealers and associations, chambers of commerce and allied organizations in the lead. A conference of protest and an attempt to secure amendment of the ban was held at Hartford yesterday and was attended by many interests.

Commissioner Bennett's contention was that the operation of trucks of five-ton or more weight or trucks and loads weighing 10 tons or more is ruinous to highways and bridges during the winter season. He explained that the ruling will only be in effect between Dec. 1 and May 1, and that permits will be issued to the operators of heavier trucks allowing use under certain conditions. Applications for the permits must be made to the State motor vehicle department at once.

Under the ruling, it will be necessary for the owner of a five-ton or over truck to state on what highways he intends to operate. At any time, if the condition of the highway, in the opinion of the commissioner, is such that the continued operation of the heavier trucks over it will prove injurious, the permits will be revoked, either temporarily or for the balance of the closed season.

Contends Limitations Beneficial

Commissioner Bennett explained to the protestants that he desires to co-operate with them and that the new order will work to their benefit, as well as to the benefit of other users of the State highways. Permits will be ready for issuance Dec. 1 to operators of trucks of five tons or over. The State motor truck department is having built numerous small sheds, or offices, along the main highways of the State, at which representatives of the department will be on duty day and night.

Representatives of the owners of trucks and other protestants have made an effort to have the permits issued by the various local chambers of commerce. Commissioner Bennett has refused to comment on this point, stating the department would co-operate with operators to the utmost of its ability and that he believes details would work out to the satisfaction of all.

In addition to representatives from practically every city of the State, representatives of the National Automobile Dealers Association, National Automobile Chamber of Commerce and National Motor Trades Association attended the protest meeting.

Automotive, industrial and allied organizations of New England are being brought into line to support legislation, whereby trunk highways will be kept free of snow and in a condition fit for travel during the winter months. Development of the ship-by-truck movement and increasing use of passenger cars during the winter months have, it is contended, made some action of this nature necessary.

Hurlburt Solvent, to Continue Company

NEW YORK, Nov. 29—Although two bankruptcy petitions had been filed against it, a jury in Judge Hand's part of the Federal Court has decided that Hurlburt Motors, Inc., is not insolvent. The testimony disclosed that the company had been making money while in control of the receiver, that a net profit had been earned, and that the action to put the company into bankruptcy followed the purchase by the Harrisburg Mfg. & Boiler Co. of assets of the old Hurlburt Motor Truck Corp. from Landon P. Marvin, receiver.

Immediately after the verdict directors of the company arranged for a meeting to-morrow to complete arrangements for taking over the property.

CREDITORS CONTROL DYNETO

SYRACUSE, N. Y., Nov. 30—Federal Judge Ray has appointed a committee of creditors to take over the affairs of the Dyneto Electric Corp., manufacturers of starting and lighting systems, with service stations in all the larger cities of the country. No estimate has been made of the assets and liabilities, but the company is said to be thorough solvent and it will be kept in operation unless something entirely unexpected develops. The creditors' committee is headed by Charles H. Sanford of the National Bank of Syracuse.

BALES RECEIVER APPOINTED

INDIANAPOLIS, Nov. 29—Thomas K. Simpson, president of the Bales Mfg. Co., manufacturers of a puncture plugging compound, has been appointed receiver for the company by Judge Carter of the Marion Superior Court on petition of Okla H. Hershman. The complaint charged that the company was in danger of insolvency. Simpson was ordered to continue the operation of automobile service stations at Muncie and Dunkirk, Ind.

Willys Pays Scrip to Meet Dividend

Preferred Stockholders Get Negotiable One-Year Notes—Suspend Financing Plan

NEW YORK, Dec. 1—Preferred stockholders of the Willys Corp. have been notified that the dividend due to-day on the stock would be paid in the form of negotiable one year scrip. This will be callable at par and payable to stockholders of record Nov. 29. The scrip dividend was decided upon to conserve cash assets and credit resources.

A statement of earnings accompanying the announcement shows net profits for the eight months ended Aug. 31, before allowing for taxes, were $3,604,600 as compared with $4,141,255 for the full year of 1919. It is conceded that the profits for the last four months of this year will not add appreciably to those for the first eight months. This would be equal to 2½ times the first preferred dividend.

It was stated that operations at the Toledo, Syracuse and Poughkeepsie plants increased until Sept. 1, but that there had been a very marked decline since that time.

No formal statement has been made on the subject, but it is understood negotiations looking toward a bank loan of some $30,000,000 for the Willys-Overland Co. have been suspended for the present as the time is not considered opportune. No immediate action is necessary and when the subject of new financing is taken up again it would not be surprising if it covered all the ramifications of the so-called Willys interests, including the Willys Corp. and the Willys-Overland Co. as well as their subsidiaries. Some action in this direction is contemplated, but the utmost reticence is being maintained in regard to its exact nature.

Small Company Asks Acceptance of Notes

NEW YORK, Nov. 30—The William Small Co. of Indianapolis, which is operating under a State court receivership, has invited its creditors to accept non-interest bearing notes in settlement of their claims and permit the lifting of the receivership. An involuntary petition in bankruptcy was filed against the company last September by two creditors, but Judge Anderson found the company was solvent and discharged the receiver. The action in the State courts then was instituted. It was understood that 85 per cent of the creditors had agreed to an extension of one year. Under the plan now proposed claims of less than $100 would be paid in cash and notes would be given for the balance, running up to four years maturity in the case of the larger claims.

Du Ponts Make Up Powerful Group

Activities Extend to Many Industries

Explosives Manufacture Foundation of Wealth—Turn War Plants to Peace Pursuits

NEW YORK, Dec. 1—The famous du Pont family of Delaware, which now has come into almost complete control of the General Motors Corp., makes up one of the most powerful industrial and financial groups in the United States. They are best known as manufacturers of explosives and this business brought them, collectively, enormous wealth. They have been steadily branching out of recent years, however, and investing heavily in many lines.

General T. Coleman du Pont, former United States Senator from Delaware, is more widely known than Pierre, who has supplanted W. C. Durant as president of General Motors, but is no more powerful in the industrial world. Besides being the directing head of the greatest automotive combine, he is a director of all the du Pont corporations and these large companies:

American International Corp., Bankers Trust Co., Chatham & Phenix National Bank and the Philadelphia National Bank.

T. Coleman du Pont's directorates include the Empire Trust Co., of which he is chairman of the board; Equitable Office Building Corp., of which he is chairman of the board; Greeley Square Hotel Co., Industrial Finance Corp., Morris Plan Bank, of which he is president; National Surety Co. and Thompson-Starrett Co.

Because of the magnitude of profits from war materials, the E. I. du Pont de Nemours & Co. was organized in 1915 to take over the assets of the E. I. du Pont de Nemours Powder Co., for which it paid $120,000,000. These assets included 22 powder plants, nine paint and varnish plants, one paper mill, two charcoal plants, one alcohol factory and five plants for the manufacture of pyralin products.

Investigate New Projects

The du Pont Engineering Corp., capitalized at $7,000,000, formed to operate a powder plant at Nashville, Tenn., was continued after the war to investigate many new projects to supplement the former enterprises of the du Ponts. Several investments already have been made, including the pyralin celluloid products and the various paint and varnish factories.

While seeking investment for war profits, the du Ponts found that General Motors appealed to them and the du Pont American Industries Co. was formed in January, 1918. The original purchase amounted to 27 per cent of the General Motors stock.

The du Pont Chemical Co. was formed in December, 1918, to purchase the military powder plants of the du Ponts. After the war all these factories were sold to the du Pont de Nemours company. The Hopewell, Va., property is the only one without a peace time occupation.

Hotel holdings acquired by the du Ponts since the war probably aggregate more than those of any other group in the country and include some of the best known and most fashionable in New York. They also own 30,000 acres of agricultural and timber lands in St. John's and Volusia counties, Florida, with fifteen miles of railroad, saw mills, turpentine plants, etc.

There are no biographies of Pierre du Pont. He has been overshadowed by Coleman until recently. He was graduated from the Massachusetts Institute of Technology in 1890 and then went to work in the du Pont organization. Later he headed a number of small steel companies and then took up his share of the family affairs. He was married in 1915 to Miss Belin of Scranton, Pa., and they have one daughter. He is much averse to publicity.

Receivership Lifted from Fort Wayne Tire

INDIANAPOLIS, Nov. 29—The Fort Wayne Tire & Rubber Co. of Fort Wayne, Ind., has been taken out of receivership by Judge Anderson in Federal Court here. Some time ago the Lincoln Trust Co. of Fort Wayne was appointed receiver for the concern.

The court, on an agreed order, also issued a temporary injunction restraining John C. Brown of Fort Wayne, president of the Fort Wayne Tire & Rubber Co., and Louis E. Kraft of Fort Wayne, secretary and treasurer of the company, from selling stock on commission and from doing other acts complained of in the original bill of complaint.

It was also provided in the injunction that the board of directors shall be increased by the addition of six new members. The board is now composed of five members. Brown and Kraft were also ordered not to vote in the election of directors, $100,000 worth of stock held by them, their possession of which is questioned by the plaintiffs.

INCREASES CAPITAL STOCK

BRIDGEPORT, CONN., Nov. 27—Liberty Mfg. Co., manufacturer of an air-cooled engine, has filed a certificate of increase in capital from $250,000 to $3,000,000. The company, a new concern, has just completed a large factory at Stratford, just over the Bridgeport one, which is soon to be in operation.

Durant to Retain Place as Director

Divisions Whip Inventories Into Shape—Working Capital of Company Very Large

(*Continued from page* 1136)

trucks, tractors and agricultural machinery. There was little chance for development along these lines, however, before the bottom dropped out of business.

There has been a very marked reduction in the last few months in the enormous General Motors inventory and the attention of the various divisions has been devoted to placing themselves in a strong financial position. This has been brought about successfully. The company had a working capital of $150,000,000 on Jan. 1, of which $110,300,000 was in cash and investment securities. Its cash position probably has been strengthened since that time and it will be further enhanced by the payment due to-day of approximately $33,000,000, the balance due from purchase of 1,800,000 shares of common stock by British and Canadian investors. Final payments also are due to-day from persons who subscribed to the remainder of the common issued last June, approximating 1,500,000 shares.

There is no reason to suppose Explosive Trades, Ltd., of London, and Canadian Explosive Trades, Ltd., will fail to complete their payments. A cable message from London to AUTOMOTIVE INDUSTRIES says that the British company is well financed and abundantly able to meet the obligation. The only cloud on its horizon is the fall in the shares of Dunlop Rubber, which it controls.

Morgans Potent Influence

The cash and investment holdings of the du Ponts are exceeded only by those of the United States Steel Corp. On the surface, at least, the du Ponts own 51 per cent of General Motors Stock, for it was announced that the approximately 3,000,000 shares purchased from Durant last week merely were underwritten by the Morgans and that the stock would be held by the du Pont Securities Corp. The Morgans will exercise a much more potent influence in the company than this would seem to indicate, however.

Any statement as to the future of Durant is purely speculative. His friends believe, however, that he may again become an important figure in General Motors through election to the chairmanship of the board. There may be significance in the fact that both this office and the presidency now are held by Pierre du Pont, which is rather unusual.

Durant still owns or controls a very

(*Continued on page* 1148)

Ryan Difficulties Not Serious to Stutz

Dumping of Collateral on Market Not Anticipated—Directors Hold Meeting

INDIANAPOLIS, Dec. 1—An unheralded visit was made to the Stutz motor plant one afternoon last week by Allan Ryan and Charles M. Schwab, it was learned to-day. They were at the factory only a few hours but inspected it thoroughly. The visit is regarded here as significant and is believed to presage announcement that Ryan's holdings in Stutz have been transferred to Schwab. President Thompson has gone to New York for a special meeting of the directors to-morrow.

NEW YORK, Dec. 1—No confirmation was obtainable here to-day of the reported transfer of Ryan's stock in Stutz to Schwab. They have been closely associated in several companies in the past, however.

NEW YORK, Nov. 30—No serious difficulties for the Stutz Motor Car Co. of America is expected in financial circles here to result from the taking over by a committee of bankers of the affairs of Allan A. Ryan, chairman of the board of the Indianapolis company. Ryan's spectacular corner in Stutz stock last March brought it prominently to public attention and as a consequence his name has been intimately associated with it.

Announcement late last week that the banks, headed by the Guaranty Trust Co. and the Chase National, had undertaken the conservation of Ryan's assets was not entirely unexpected. When the governors of the Stock Exchange ruled Stutz off the big board as the result of the corner Ryan began litigation against them and his suit still is pending. He resigned from the exchange and his seat was sold. The Stutz stock now is listed on the curb and the last quotation there was $100 bid with $200 asked.

Liabilities Approximate $16,000,000

Ryan's financial difficulties are due to the rapid decline in securities pledged as collateral for bank loans. This alarming shrinkage led to action by the banks. The liabilities involved approximate $16,000,000. It is believed the assets considerably exceed this sum. The loans were negotiated by Ryan in his financing of various companies in the past year and a half. These corporations include Stutz, Stromberg Carburetor Co., Continental Candy Co., Chicago Pneumatic Tool Co. and Hayden Chemical Co. He retired some time ago from Stromberg.

It was popularly supposed Ryan had cleaned up about $1,000,000 on the Stutz corner but this was largely a paper profit. He bought the stock all the way up from $150 to $400 a share. The settlement price for the shorts was $550 and in the outside market it rose as high as $700.

Ryan is understood to have worked in entire harmony with the bankers until last Friday when he suddenly turned against them. He tried to enlist the aid of Comptroller of the Currency Williams, who has denounced New York banks for the high rates of interest on call money and announced that he would retain Samuel Untermyer as his attorney if the famous lawyer would accept. It is considered possible, also, that his millionaire father may come to his assistance.

Should the bankers retain control of Ryan's stock, pledged as collateral, it is stated on the highest authority that the securities will not be dumped on the market for whatever they will bring, especially in the case of Stutz, which is said to be in a rather enviable position. The stock either will be held until it can be sold for something like its real value or it will be sold to some one who will have the best interests of the company and its stockholders at heart.

Stutz a Favorite Interest

On the other hand, if Ryan succeeds in paying his bank loans and getting control of his collateral, no one can tell what his course will be. It should not be forgotten, however, that Stutz has been one of his pet interests and it is not considered likely he will leave it in the lurch. Ryan has had a somewhat spectacular career in the financial world and has a reputation as a fighter who is abundantly able to take care of himself.

There are outstanding 200,000 shares of Stutz stock of no par value, including 100,000 shares issued as stock dividends early this year. The stock was increased from 75,000 shares to 100,000 in August, 1919. The quarterly dividend rate has been $1.25 a share. It is understood Ryan owns about 80 per cent of the stock.

There has been much discussion of the present value of Stutz stock. Its net profits last year, before depreciation and taxes, were $892,000. Facilities were provided for increased production this year but the slump in the market has decreased the demand for cars as is the case with all other companies. The prices of Stutz cars were not cut but increased when others were marking down their lists. A market value of as low as $50 a share would give the capitalization a value of $10,000,000. One of the chief difficulties is that there has been nothing but an artificial market for the stock since it was stricken from the exchange.

President W. N. Thompson of the Stutz company arrived in New York to-day to attend a meeting of the directors Thursday. Before leaving Indianapolis he said he did not see how the Stutz company would be embarrassed by Ryan's difficulties.

UNION STEEL CUTS PRICE

DETROIT, Nov. 30—Notice has been issued to the industry by the Union Drawn Steel Co., Beaver Falls, Pa., through its Detroit office, of a reduction of 15 3/10 per cent in the base price of cold drawn steel effective to-day. The new price is $3.60 per 100 lb., a reduction of about $13 a ton.

METAL MARKETS

HOW long will the independent steel interests be able to maintain their prices on a parity with the U. S. Steel Corporation's levels? That is the question which is uppermost in the minds of those who follow the steel market's trend. The answer depends entirely upon the motive that prompted the leading interest among the independents to make announcement of the dowward revision of its prices to the United States Industrial Board's scale which the Corporation has adhered to since March, 1919. Either there is some actual business in sight and the Jones & Laughlin Steel Co. felt that at the same price the independents would have a good chance to land it, or else the reduction is in the nature of a trial balloon for the purpose of testing to what extent buyers will respond. While there is every indication that automotive consumers are sounding the market with a view to placing orders for moderate tonnages, this abeyant demand appears to be largely for sheets for which independents continue to quote, nominally at least, varying premiums over the Corporation's prices. There is no question that many of the smaller independent interests are getting to be harder up for orders from day to day, and, if these orders, at least in many instances, are not to go to swell the Corporation's unfilled tonnage, they must be booked at prices lower than those of the Corporation. Judge Gary's announcement of a few weeks ago that the Corporation's subsidiaries would adhere to prevailing prices makes it reasonably certain that the year 1921 will open with the Corporation's prices as the maximum levels from which there will be discounts in numerous transactions between independents or resellers and consumers.

Pig Iron.—The market continues to drift. There has been some talk of the possibility of bringing in Belgian pig at prices several dollars below prevailing nominal quotations. Pig iron interests appear to be in a somewhat more reasonable frame of mind and admit that eventually the market will settle at somewhere around $30, Valley, i. e., provided continually exorbitant coke prices give way.

Steel.—Middle West rolling mills specializing in automobile sheets are now eager for business at around 6.85c., or $20 a ton below the price quoted a few weeks ago. With sheet bars obtainable at around the Corporation's price of $47, the sheet market is tending lower and lower, although independents claim that they simply cannot make both ends meet at the conversion rate which the Corporation's sheet prices imply. The independents, generally, look for an active sheet demand early next year and show considerable confidence in a continuance of modest premiums on sheets over the Corporation's levels. Cold rolled strip steel could be secured to-day on firm bids of 7c. and hot rolled strip at 4c.

Aluminum.—Some importing interests, believing that one of the first commodities on which the incoming Congress will advance import duties will be aluminum, are inserting clauses in their sales contracts that any advance in duty is for buyers' account. Foreign virgin metal is offered at as low as 26c. for 98 to 99 per cent virgin ingots.

Copper.—Following sales of electrolytic at as low as 13¾c., the market is a shade steadier. Producers are busy cutting production and wages.

Tin.—American 99 per cent tin has been sold at as low as 33c.

Lead.—The market has sagged further and is now a 5½c. affair, both New York and East St. Louis basis.

INDUSTRIAL NOTES

Oshkosh Motor Truck Co., of Oshkosh, Wis., expects to complete the transfer of its operation from its old plant on Forest Avenue into its new works on Oregon Street shortly after Dec. 1. The present investment in plant and equipment is in excess of $250,000. A local syndicate financed the construction of the new factory. Payments by the truck company on the contract account already are considerably in excess of the requirements.

Lincoln Light Corp., Milwaukee, has been organized with a capital stock of $250,000 to manufacture and deal in generating systems, fixtures, appurtenances, etc. The incorporators are Adolph, James and Herbert Mahler, 219 Twenty-eighth Street, Milwaukee.

Duplex Storage Battery Co., originally established in Milwaukee a year ago as a manufacturer of storage batteries and now operating in its new plant at Beaver Dam, Wis., has been reincorporated in Delaware with an authorized capitalization of $600,000. The investment in Wisconsin is $75.000. Peter Kettenhofen, formerly superintendent of the Malleable Iron Range Co., of Beaver Dam, has become associated with the Duplex company as business manager. William Petschel is president and chief engineer.

Stewart-Warner Speedometer Corp. is completing additions to its plants which cost $1,000,000. The corporation is about to place three new Stewart accessories on the market.

C. L. Best Gas Traction Co. has changed its name to the C. L. Best Tractor Co. Net profits for the nine months ended Sept. 30 were $533,451. The balance sheet shows profit and loss surplus of $827,258 and total assets and liabilities of $2,715,820.

Hartford Battery Mfg. Co. is now assembling 100 batteries a day at its San Francisco branch known as the Guarantee-Hartford Battery Co.

Kelley Tire & Rubber Co. factories are nearing completion at West Haven, Conn. Production is expected to start soon after Jan. 1.

General Motors Acceptance Corp. offices have been moved from Broadway and Fifty-seventh Street, New York, to 120 West Forty-second Street. The General Motors Export Corp. offices are also in the new building.

Main Electric Co., Cleveland, has reduced prices on its Main electric lighting and power plants.

Ford Motor Co. established records for tractor production in its plants from June to October. The combined output by months was: June, 9,149; July, 9,776; August, 10,248; September, 10,200. More than 50,000 tractors were turned out in the six months up to Aug. 18. Ford has announced that he will start operations immediately in the Imperial mine in Barega County, Michigan, which was included in his recent purchase of ore and timber lands.

Lexington Motor Co. has purchased for $260,000 a building under erection on Fourteenth Street, Long Island City, and will use it for a service and repair plant.

OAK TIRE ADDS TO CAPITAL

TORONTO, ONT., Nov. 29—Reorganization of the Oak Tire & Rubber Co., Ltd., is taking place, and in connection with the increase of the authorized capitalization from $400,000 to $3,000,000 a stock dividend of 100 per cent is being paid to shareholders in the original concern. A quarter of a million dollars of 8 per cent preferred stock will be sold to provide funds for extensions to the plant at Oakville, Ont., and for machinery and working capital. The company was originally organized in 1916. The capacity at present is 300 tires a day, but when the extensions to be provided out of the present financing are completed the capacity will be 500 tires a day.

The company's balance sheet of June 30 showed current assets of $320,654 and current liabilities of $187,942. Total assets were $666,964 and the balance $106,823. Net earnings for six months were $66,976.

Durant to Continue as G. M. C. Director

(*Continued from page* 1146)

large block of General Motors stock. He has been the commanding figure in building up General Motors to its present gigantic proportions and ranks among the leaders in the industrial and financial worlds. It is universally conceded that his career as a man of affairs is by no means over and that sooner or later, unless he returns to General Motors, he will be found at the helm of some other great enterprise.

This is the second time in the history of General Motors that Durant has lost control of the company. General Motors is essentially a Durant creation, representing his foresight in estimating the phenomenal growth of the automobile industry. So pronounced was the advancement of the company that in 1910 there was urgent need for cash to meet the expansion program and a loan was negotiated in Wall Street through J. & W. Seligman. A five-year voting trust was formed and Durant suddenly found himself an outside figure in relation to the company so far as active management was concerned.

He bided his time and ultimately won back control after the issue of notes had been paid off out of earnings, and the voting trust dissolved. A spectacular stock market operation was involved whereby Durant bought up control. He had organized the Chevrolet Motor Co. and proposed that General Motors buy it. This General Motors refused to do, and Durant proposed then that Chevrolet should buy General Motors. He succeeded in this by offering five shares of the smaller company's stock for each share of the older company, and control passed to him.

CHANDLER EARNINGS $8,300,000

CLEVELAND, Nov. 27—Earnings of the Chandler Motor Car Co. will be in the neighborhood of $8,300,000 for the year ending Dec. 31 next. This makes an approximate return of $29 per share before taxes are deducted, or around $23 per share after taxes are deducted. Production has been reduced to 800 cars a month from the peak figure of 3000 attained in mid-summer. This quantity compares favorably with other years with the exception of 1919. The 1920 production is expected to exceed 24,000.

Bank Credits

Written exclusively for* AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.

NEW YORK, Dec. 2—While the easing in money rates has not continued long enough to draw positive conclusions, it is regarded by some as an indication of the relaxing of the credit strain. The ruling rate for call money last week was 6 per cent with a range of 5 per cent to 7 per cent, as compared with 6 per cent to 9 per cent the week before.

Time money was offered in abundance at lower rates than the week before. The rate on 60 and 90-day paper was 7 per cent to 7¼ per cent as against 7¾ to 8 per cent the previous week, while the rate on 4, 5 and 6-months paper dropped to 6 per cent as against 7¾ per cent the week before. The rates quoted varied with the quality of the collateral and the credit of the borrower.

In part, this easing of money has apparently been effected by the return of money to the financial centers following the passing of the peak of the crop moving season, and by the large scale liquidation which has been occurring on the stock market.

There were no particularly outstanding features in the week-end bank statements. Loans of the New York associated banks declined last week $13,355,000, while total net deposits increased slightly. Reserves declined from an excess of $12,470,380 over legal requirements the previous week, leaving a deficit of $4,085,500, caused in the main by a reduction of $15,692,000 in member bank reserve deposits.

The New York Federal Reserve Bank showed improvement in its reserve position. Total cash reserves increased $8,728,127. Bills on hand declined $11,473,747, total earning assets $16,897,102, and net deposits $15,571,410.

The Federal Reserve Banks as a whole improved their reserve position also, chiefly because of an increase in cash reserves of $15,052,000 and a decline in net deposits of $9,099,000. Bills on hand increased $34,352,000, in spite of a decline of $27,524,000 in bills bought on the open market. Federal Reserve notes in circulation increased $18,194,000. The ratio of gold reserves to Federal Reserves notes in circulation, after setting aside 35 per cent against net deposits, was 48.9 per cent last week as against 48.6 per cent the week before.

MURRAY BUYS ST. LOUIS PLANT

ST. LOUIS, Nov. 29—The J. W. Murray Mfg. Co. of Detroit has purchased the plant of the St. Louis Paper Can & Tube Co. in the northwest industrial district, of which the Buick and Chevrolet plants form a part, for use as a motor car crown fender and gasoline tank factory. Possession will be given March 1. The consideration was not stated but was approximately $250,000.

FINANCIAL NOTES

Rowe Motor Mfg. Co., Lancaster, Pa., has increased its capital stock from $500,000 to $2,000,000.

Automobile Finance Corp., Richmond, Va., has been granted a charter authorizing a maximum capitalization of $300,000.

Ohio State Tire Co., Port Clinton, Ohio, has issued notes of $59,971.81 to cover a judgment secured against it by A. W. Bruess, president of the company, and five stockholders.

A. B. Hudson, K. C., will head an automobile finance corporation to be formed at Winnipeg with a capital of $3,000,000, of which $1,500,000 is 8 per cent preferred stock and the balance common.

National Motor Car & Vehicle Corp. stockholders will meet Dec. 8 to authorize an increase in stock from 80,000 shares to 150,000, of which 140,000 will be common stock without par value, and 10,000 preferred with a par value of $100. The preferred will be 8 per cent cumulative.

Frick-Geiser Co. has been incorporated in Pennsylvania with $3,000,000 capital to take over the plant of the Emerson Brantingham Implement Co., at Waynesboro, Pa., and the light machinery manufactured by the Frick company. The Emerson company reserves the Minneapolis tractor, the manufacture of which will be transferred to one of its Western plants.

Pontiac Body Co. directors have filed application to have the company dissolved. General Motors bought the company in March, 1919, and there is still to be distributed to stockholders $7,778 due on the purchase and $20,000 in the bank.

Commercial Credit Co., Baltimore, will increase its capital stock to 240,000 shares, a 100 per cent increase. This will be divided equally between common, preferred and class B preferred (all $25 par). A 20 per cent stock dividend will be paid Dec. 31. The usual 12 per cent a year cash dividend will be continued.

Norwalk Tire & Rubber Co. reports gross sales for the eight months ended Aug. 31 as $3,048,800, and net profits after all charges but before Federal taxes of $703,807, or at the rate of nearly ten times dividend requirements.

Victor Rubber Co. reports earnings for the nine months ended Sept. 30 as $105,624, before Federal taxes but after reduction for all other reserves. Current assets are $1,253,990, compared with $697,319 current liabilities.

Bergougnan Rubber Corp., Trenton, has paid its usual quarterly dividend of 1¾ per cent on preferred stock for the quarter ending Oct. 31.

Dearborn Garage Equipment Co., Kalamazoo, Mich., has increased its capital stock from $100,000 to $200,000.

Gerline Brass Foundry Co., Kalamazoo, Mich., proposes to increase the capital stock from $20,000 to $100,000.

Curran-Detroit Radiator Co. will pay the first regular quarterly dividend of 2 per cent cash Dec. 20.

Union Twist Drill Co. has declared a quarterly dividend of 62½ cents a share on common, payable Jan. 3.

Diamond Holfast Rubber Co., will construct a new factory building that will serve to increase the plant's capacity.

Gray & Davis showed a profit in August of $8,600 and in September of $3,400. Indications are that the October showing will be better than that for September. These profits are based on a very conservative inventorying basis and after depreciation charges at the rate of $200,000 a year. The Cambridge plant is operating at about 35% capacity and the Amesbury lamp plant is being overhauled.

Goodyear Financing May Reach $35,000,000

AKRON, Dec. 1—Regarding the Goodyear Tire & Rubber Co.'s program of permanent financing now being negotiated, an official statement was issued to-day by Vice-President G. M. Stadlemen. The statement follows:

"Some time ago the Goodyear Tire & Rubber Co. made an arrangement with a group of banking interests for a temporary loan of $25,000,000 to help carry its inventory, which, while high based on present business, would have been normal under usual conditions. The loan will be payable Feb. 15, 1921. It was made to enable the company and the bankers to work out permanent financing plans in the interim.

"Our annual meeting is scheduled for Dec. 6, but will be adjourned and a special meeting held shortly thereafter, at which time the permanent financing plan will have been completed, and will then be announced."

There are reports that the permanent financing may involve $35,000,000.

Reo Motors Assets Increase $6,000,000

DETROIT, Nov. 30—Total assets of $22,175,689, an increase of about $6,000,000 over last year, is shown on the Reo Motor Car Co.'s balance sheet as of August 31. The surplus of $9,747,399 is an increase of about $3,400,000 over 1919 and is equivalent to $18 a share on approximately $7,000,000 outstanding capital stock. Current assets are $15,263,727, an approximate increase of $4,000,000, and liabilities $5,491,120, an increase of approximately $2,300,000. Net working capital is $9,772,598, which is an increase of approximately $1,000,000. Capital assets are $5,595,704 after charging $1,048,819 for depreciation. Investments are $1,250,819 compared with $80,797 a year ago due to increased valuation of branches. The report shows $1,000,000 in notes payable in the 1919 balance sheet eliminated. Reserves include $2,740,303 for Federal and local taxes.

FULLER & SONS IN OPERATION

KALAMAZOO, MICH., Nov. 30—Fuller & Sons Mfg. Co., which was reported in AUTOMOTIVE INDUSTRIES as being shut down, was inactive for only a week, and that, states W. P. Fuller, because of a lack of shipping specifications. Since that time the plant has been in continuous operation with a reduced force and expects to continue.

MEN OF THE INDUSTRY

R. E. Chamberlain, for the last four years truck sales manager for Packard Motor Car Co., has been promoted to assistant general sales manager. Chamberlain formerly was branch manager at Philadelphia for Garford Motor Truck Co.

Col. Sidney D. Waldon, formerly with the Packard and Cadillac organizations and prominent in aviation engineering circles, has been elected president of the Detroit Automobile Club to succeed Edward N. Hines.

W. R. Wiley has been appointed production manager of the Apex Motor Corp. to succeed C. L. Graham, who has resigned to take charge of service on the Ace car on the Pacific Coast. Wiley for the past three years has been chief engineer of the King Motor Car Co.

W. J. Murray has been appointed general sales manager of the Troy Wagon Works Co., Troy, Ohio. Formerly he was with Splitdorf and the Arc Cutting & Welding Co.

George T. Bryant has been appointed director of sales of Robert H. Hassler, Inc., Indianapolis. For the past several months Bryant has been in charge of export sales for the company, during which he increased this business largely.

Charles S. Clark has resigned as sales, export and advertising manager of the H. J. Koehler Motors Corp., Bloomfield, N. J., after three years of service. His plans for the future are not announced. Clark has been connected with the motor truck and automobile industry for sixteen years, having served as an executive in each of the positions he held with the Koehler company.

W. F. Fike and George C. Mecklin, both well known for their success in tire building and calendering, have joined the Syra-Cord forces at Syracuse. Fike was with the Goodrich and Miller rubber companies. Mecklin for several years has been head of the calender department of the Miller Rubber Co.

Reorganization Ready on Maxwell-Chalmers

NEW YORK, Dec. 1.—At a meeting yesterday of the Maxwell-Chalmers reorganization committee, headed by Walter P. Chrysler, a committee of four was appointed to declare the plan of reorganization effective whenever the time seems opportune. There is no longer any doubt that the plan will become effective but the committee will wait for the psychological moment before putting it into effect. The committee is headed by E. R. Tinker, a vice-president of the Chase National bank who drafted Chrysler and J. R. Harbeck to take charge of the muddled affairs of the two companies. Time to file application for purchase of more than the minimum amount of stock in the new company which will be formed has been extended until Jan. 3. It is expected the allotment will be made Jan. 6.

KARDELL CREDITORS MEET

ST. LOUIS, Dec. 2—The Kardell Tractor & Truck Co. has called a meeting of its creditors for to-day. The company recently announced that it would increase its capital from $1,000,000 to $3,000,000.

Calendar

SHOWS

Dec. 7-10—Cincinnati, Automobile Show in connection with Ohio Automotive Trade Ass'n Convention, auspices of Cincinnati Automotive Trade Ass'n, Music Hall, J. J. Behle, Mgr.

Dec. 10-18—New York. Motor Boat Show. Grand Central Palace.

Dec. 11-20—Los Angeles, Annual Automobile Show, Los Angeles Motor Car Dealers' Ass'n.

Jan. 3-8 — New York, Motor Truck Show, Motor Truck Ass'n of America, Twelfth Regiment Armory.

Jan. 8-15—New York. National Passenger Car Show, Grand Central Palace. Auspices of N.A.C.C.

Jan. 10-17—Portland, Ore., Annual Automobile Show, Automobile Dealers' Ass'n. Municipal Auditorium, M. O. Wilkins, Mgr.

Jan. 15-29—Philadelphia, Annual Automobile Show, Philadelphia Automobile Trade Ass'n.

Jan. 17-23—Milwaukee. Annual Automobile Show, Milwaukee Automotive Dealers' Ass'n.

Jan. 22-27—San Francisco, Second Annual Pacific Coast Automotive Equipment Exposition, Auditorium.

Jan. 22-29—Baltimore, Annual Automobile Show, Baltimore, Automobile Dealers' Ass'n, 5th Regiment Armory, J. C. O'Brien, Mgr.

Jan. 22-29—Cleveland, Annual Passenger Car Show, Cleveland Mfr's & Dealers' Ass'n, Wigmore Coliseum.

Jan. 22-29—Montreal, Annual Automobile Show, Montreal Automobile Trade Ass'n, Motordrome Bldg.

Jan. 29-Feb. 4 — Chicago, National Passenger Car Show, Coliseum, Auspices of N.A.C.C.

Feb. 5-12—Minneapolis, Annual Automobile Show, Minneapolis Automobile Trade Ass'n.

Feb. 6-12—Columbus, National Tractor Show, Columbus Tractor & Implement Club, Ohio State Fair Grounds.

Feb. 12-19—Hartford, Conn., Annual Automobile Show, Hartford Automobile Dealers Ass'n. Armory, Arthur Fifoot, Mgr.

Feb. 12-19—Kansas City. Annual Automobile Show, Kansas City Motor Car Dealers' Ass'n.

Feb. 14-19—St. Louis, Annual Automobile Show, St. Louis Automobile M'f'rs & Dealers' Ass'n, Robt. E. Lee, Mgr.

Feb. 14-19—Winnipeg, Western Canada Automotive Equipment Show.

Feb. 18-28—San Bernardino, Cal., National Orange Show, Fred M. Renfro, Mgr.

Feb. 19-26—San Francisco, Fifth Annual Pacific Automobile Show, Exposition Auditorium, George Mahlgreen, Mgr.

Feb. 21-26—Louisville, Annual Automobile Show, Louisville Automobile Dealers Ass'n, First Regiment Armory, C. L. Alderson, sec'y.

Mar. 2-10—Des Moines, Annual Automobile Show, Coliseum. C. G. Van Vliet, Mgr.

Mar. 5-12—Brooklyn, Annual Automobile Show, Brooklyn Motor Vehicle Dealers' Ass'n, 23d Regiment Armory, George C. Lewis, chairman.

Mar. 7-12—Syracuse, N. Y., Annual Automobile Show, Syracuse Automobile Dealers Ass'n, Armory, Howard H. Smith, Mgr.

Mar. 7-12—Indianapolis, Annual Automobile Show, Indianapolis Automotive Trade Ass'n, Automobile Bldg., State Fair Grounds, John Orman, Mgr.

Mar. 12-19—Boston, Annual Automobile Show, Mechanics Bldg. and South Armory.

Mar. 14-19—Omaha, Annual Automobile Show, Omaha Automobile Trade Ass'n, Inc., Omaha Auditorium, C. G. Powell, Mgr.

April 4-9—Seattle, Annual Automobile Show, Seattle Motor Car Dealers' Ass'n, Arena Hippodrome.

April— Chattanooga, Tenn., Spring Automobile Show, Chattanooga Automotive Trade Ass'n, Sunday Tabernacle, C. A. Noone, sec'y.

FOREIGN SHOWS

Jan. 7 — Sydney, Australian Motor Show.

Jan. 22-29 — Colombo, Ceylon Motor Show.

Feb. 7—Delhi, India, Delhi Motor Show.

Mar. 23-28—Witwatersrand Agricultural Show including machinery and motors sections.

CONVENTIONS

Dec. 7-10—New York. Annual meeting American Society of Mechanical Engineers. Engineering Societies Building.

Dec. 8-9 — Cincinnati, Annual Convention, Ohio Automobile Jobbers' Association

Dec. 13—Washington, Convention of American Association of State Highway Officials.

Dec. 28-30 — Chicago, Annual Meeting American Society of Agricultural Engineers.

Jan. 7—New York, Advertising Managers Council, Motor & Accessory Manufacturers' Ass'n.

Jan. 11-13—S. A. E. Annual Meeting, New York City.

Feb. 2-4—Chicago, First Annual Meeting, Automotive Electric Service Assn. Hotel La Salle.

May 4-7 — Cleveland, National Foreign Trade Council.

Oct. 12-14, 1921—Chicago, Twenty-Eighth Annual Convention National Implement & Vehicle Ass'n.

Exports for October Increase $150,000,000

WASHINGTON, Nov. 26—Exports from the United States for the month of October were almost $150,000,000 in excess of those of September. This fact, announced to-day by the Department of Commerce, was not generally expected. The respective figures for the two months were officially given as $752,000,000 and $605,000,000. Imports were slightly lower during the month, the comparative figures showing $362,000,000 for October and $363,600,000 for September.

The report considers all export business and the automotive division of it was not given. The figures for it will not be available for some weeks but on other showings it is considered probable that the automotive exports will be as large if not larger than those of September.

The surprising increase was due probably to the decreased prices which came into effect with the fall months. Grain and cotton were both taken in larger volume because of this decrease and it is believed that many lines of manufactured goods probably were taken similarly.

TO DECIDE IMMEL FUTURE

COLUMBUS, Nov. 29—The future of the Immel Co., large body manufacturers of Columbus, which has been in the hands of R. H. Schriver, as receiver, for the past two months, will soon be determined by a meeting to be called by the receiver. The American Appraisal Co. has completed an appraisal of the assets and an auditing concern will soon complete the auditing of the accounts. When this work is finished a meeting of the creditors and stockholders will be called to discuss its future. F. A. Miller is now in charge of operations and the output has been doubled under the receivership, with much less overhead.

Motor Products Shows Assets of $5,616,394

NEW YORK, Nov. 30—The balance sheet of the Motor Products Corp. of Detroit, as of Oct. 31, shows net quick assets of $5,616,394. Its inventories are valued at $2,131,646, notes receivable and trade acceptances total $285,003, accounts receivable $1,288,906, and cash $2,796,744. Current liabilities include accounts payable of $328,272, salaries and payroll, $91,286, and a total of $483,912 for accrued interest, taxes and reserves. Allowance also is made for bad debts.

RAY BATTERY IN NEW PLANT

YPSILANTI, MICH., Nov. 29—Ray Battery Co., formerly of Detroit, is in production in its new factory and with the completion of the work of installing machinery a schedule of thirty a day by the first of the year has been laid out. The factory is equipped with all the speed-up machinery necessary to maintain production schedules, according to President R. R. Fisher.

Ontario to Increase Motor Vehicle Fees

TORONTO, ONT., Nov. 29—Increased license fees will be charged owners of motor cars by the Department of Public Works next year, when Hon. F. C. Biggs, Minister of Public Works, hopes to increase the revenue of the province from this source by $750,000. The revenue this year amounted to more than $2,000,000. "As the automobiles use the roads the most," Hon. Mr. Biggs said, "we feel that they should pay their share of the cost of the highways."

The number of cylinders in automobile engines is taken into account in the new licenses, which was never done before. The fee for passenger cars of 25 hp. or less will be from $13 to $20. The present fee is $10. For passenger cars of 25 to 35 hp. the fee will range from $15 to $35. The present fee is $15. Cars of 50 hp. or over will pay from $30 to $40. The present fee is $30. The smallest motor truck, which now pays $10, will be $13. Trailers, which at present pay nothing, will be charged from $2 to $5.

CLIMAX ENGINE FOR STROUD

CLINTON, IOWA, Nov. 27—The Climax, Model KU 5 x 6½-in. tractor engine has been adopted by the Stroud Motor Mfg. Assn., San Antonio, Tex., as standard equipment in its All-in-One tractor. Plans are being made for a production of from 1000 to 2000 tractors in 1921.